SANDIA CORPORATION

LAB NEWS

PRIME CONTRACTOR TO THE ATOMIC ENERGY COMMISSION / ALBUQUERQUE, NEW MEXICO / LIVERMORE, CALIFORNIA

VOL. 18, NO. 12, JUNE 17, 1966

SIGNING IN—Dick Chapman (3154), left, assists the first group of the 80 Youth Opportunity Campaign participants who will join the Sandia Laboratories for the summer. This is the second year Sandia has participated in the national program which provides meaningful work and training opportunities for students. The students, from left, are Christina Candelaria, UNM sophomore; Eddie Ruth Smith, a UNM freshman next year; Maureen Roesch, UNM sophomore; and Harry DeLong, UNM freshman next year.

Youth Opportunity Campaign

Sandia Corporation has received a Youth Opportunity Campaign certificate of appreciation. Accompanying the certificate was the following letter signed by Vice President Hubert H. Humphrey.

"Your support of the President's 1966 Youth Opportunity Campaign and the support received from thousands of others proves again our country's capacity to unite in the solution of a common problem. I know I speak for the President when I say that you have our deep appreciation.

"Our youth and our nation have benefited by your action, and I congratulate you on the role you played in opening opportunities to youths. I would hope, too, that your satisfaction with your contribution to the future is equal to my pride in knowing that there are people like yourself standing ready to help."

Sandia Adhesives Lab Called Upon to Solve Sticky Problems

Using a synthetic resin adhesive, a steel hook can be glued to the top of a truck. Within minutes, a large crane can lift the truck by connecting to the steel hook. It is an impressive demonstration of bonding.

"This particular adhesive (based on a cyanoacrylate resin) is good to use where speed of bond formation is of prime importance," says Nick DeLollis (1133), project leader for Sandia's Adhesives Laboratory. "But it loses strength outside of a very limited temperature range, exposure to moisture tends to degrade it, and its uses are limited for Sandia work."

Since the mid-forties, progress in adhesives has paralleled the most dramatic developments in technology. Just as transistors brought a revolution in electronics, adhesives have made possible lightweight structural fabrications undreamed of 20 years ago. Adhesives pervade modern industry, construction, consumer products, packaging, and they're handy around the house.

Anyone with an adhesives problem at Sandia looks up Nick DeLollis. He has solved some sticky ones and the door of his lab stays open. The "drop-in" trade might include an aerodynamicist who wants to bind a new ablative material to aluminum, or a field test engineer with a leaky parachute flotation bag. For each case, Nick and the Adhesives Laboratory staff find the right material to do the job.

This isn't easy.

There are hundreds of commercially available adhesives, each with varying characteristics which must be considered in terms of the particular problem at hand. The lab performs a continuing evaluation program and tries to keep up with an ever-expanding supply of adhesives applications reports.

Many of Nick's problems center around the expansion and contraction characteristics of different adherent materials — ceramic, metallic, and synthetic. The adhesive bond between materials must either be flexible enough to absorb the dimensional variations or else strong enough to hold the pieces rigid, even under the forces resulting from rapid temperature changes. For reentry vehicles, coming into the thermal shock of the atmosphere from space, violent heating may create "outgassing" problems for some adhesives. Some of the adhesive components become volatile and either

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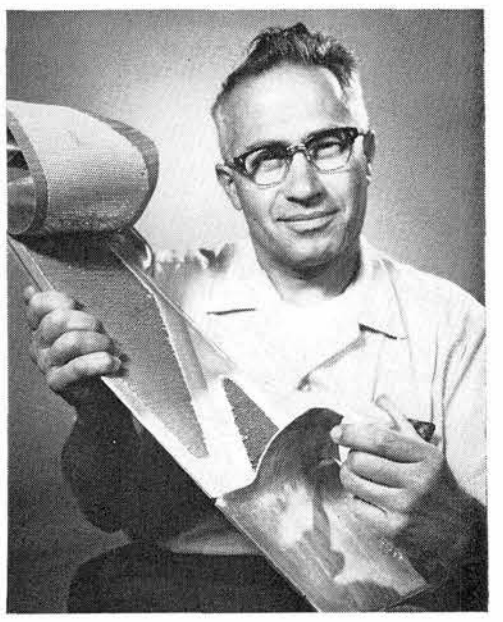

NICK DELOLLIS (1133), Sandia's adhesives authority, displays a sample of structural fabrication using aluminum honeycomb bonded with adhesives to thin aluminum walls. Results of a destructive "peel strength" test show that the aluminum failed before the adhesive. Note the honeycomb metal still adhered to upper peeled-back portion.

More Bachelor Degrees Awarded Sandians at UNM

Bachelor's degrees were awarded two more Sandians during commencement exercises at the University of New Mexico last week.

J. F. Hudson (5211) received a BS degree in physics, and W. E. Scott (2225) earned a BA degree in English. Both completed part of their study under Sandia's Educational Aids Program.

Charles Winter Is New Deputy Director, Military Application

Charles Winter, manager of Special Assignments Department 5640, has been appointed Deputy Director of Military Application, the Atomic Energy Commission's Division of Military Application announced last week. Until now this position has been held by a military officer.

He has been granted a leave of absence from Sandia to handle the assignment. As Deputy Director he will report to Brig. Gen. D. L. Crowson, director, AEC/DMA. It is anticipated that Mr. Winter will serve three years on this assignment.

From January 1962 until May 1966, he was manager of Advanced Systems Development Department 5630.

Mr. Winter joined Sandia Corporation in 1952 and worked in engineering project groups until 1956 when he transferred to Livermore Laboratory. He was promoted to supervisor of a project section at Livermore the following year and became supervisor of the Preliminary Analysis Division in 1958.

Mr. Winter earned his Master's degree in mechanical engineering at Harvard University in 1947 and also studied mechanical engineering at the City College of New York. He is a member of the American Society of Mechanical Engineers.

Two Years of Advanced Study

53 Complete Tech Development Program

GRADUATES of Sandia's Technical Development Program marked the completion of the two-year course of advanced study with a luncheon at the Coronado Club last week. S. P. Schwartz, Sandia Corporation president, addressed the group.

Fifty-three members of the 1966 Technical Development Program class received congratulations from S. P. Schwartz, Sandia Corporation president, at a luncheon last week at the Coronado Club. The occasion recognized the completion of the two-year program of advanced study at the University of New Mexico. TDP participants work at regular assignments half of the day, attend classes the other half.

"We are proud of your academic achievements," Mr. Schwartz said, "and we are looking forward to your contributions to Sandia's technical achievements."

He reviewed briefly some of the Company's current projects—advanced development, sterilization of planetary probes, development of isotopic power supplies for aerospace applications, and others—commenting that "we have plenty of work to do."

Mr. Schwartz said that these projects came to Sandia partly as a result of the excellent technical reputation built by dedicated individuals and groups at Sandia through the years. He called on the TDP graduates, as responsible scientists and engineers of the future, to maintain the Sandia standards.

He noted that the gathering represented graduates of 28 top educational institutions from throughout the country and the level of academic achievement was high. A good indication, he said, of the kind of people selected for the program and the kind of results to expect.

Eight of the participants in the program were hired with Master's degrees and took

(Continued on Page Eight)

Editorial Comment

The late John Smith, owner of a small boat, said to the late John Brown, "Whatdoya mean a life jacket, we're just going fishin' and we'll be in sight of the shore the whole time."

Came the storm (typical lake-type—sudden and severe), and the shore was too far away.

It doesn't take a storm to cause fatal mishaps in boating—in fact only 13 percent of boating fatalities are due to bad weather. Most boating accidents are due to inexperience and carelessness.

Boating is becoming more popular in New Mexico, and whether you have your own boat, rent one, or join friends for fishing or sport, it's up to you to see that the outing is pleasurable, not catastrophic.

Every boat, regardless of size, should be equipped with life preservers or life jackets, an anchor, and paddles (even though the boat may have a motor).

It may lessen vacation fun to refuse to go out in a boat without these items. It will certainly lessen vacation fun if there's a fatality.

No Sickness Absences for 26 Employees with 10 to 20 Years Service

Twenty-six Sandia employees have worked ten years or more without an absence due to illness. Their combined attendance records account for more than 527,000 manhours worked without time off because of sickness.

One member of the group, who prefers not to be singled out for special recognition, has worked a total of 20 years and four months without one absence charged to sickness.

"There were days," the record breaker commented, "when I wasn't in top condition, but I reported for work anyway."

Members of the group who were contacted for comments on their attendance records generally stated that they were just fortunate.

Roger G. McKenzie, Administrative Support Division 2552, stated that he is shooting for twenty years of perfect attendance. He has been neither late nor off ill during his 14½ years with Sandia.

With over 12 years service, Naomi L. Myszkowski has had no sickness absences. Naomi, a secretary in Secretarial Services Division 3126, states, "There has been a lot of sickness around me, but I have been very fortunate."

Back in the early fifties, Edward P. Darnell, a layout operator in Machine Shop Division 4254, was off ill for a day. He has had no sickness absences since then. Ed, who has almost 15 years with Sandia, reports that he has been healthy all of his life, with the exception of some childhood diseases.

"There is no special element involved," Leonard J. Flesner stated in reply to a question about his no sickness-absences record. An administrative staff member in Stockpile Sampling Division B 2125, he feels he's just been lucky.

Other long-service employees with records of no sickness absences in 10 or more years with Sandia are: John H. Findlay, 1400; L. J. Heilman, 2100; Joseph F. Calek, 2113; Joseph Suknot, Jr., 2211; William C. Kraft, 2440; Werner W. Bach, 2511; Daniel J. Aquino, 2553; Lester G. Baumann, 3242; Chester L. Cox, 3242; and Emily Makal, 4136.

Also members of the no-sickness-absences group are Myron W. Barnes, 4152, Katherine A. Roger, 4152; Haddon C. Redding, 4151; Vivian R. Hedman, 4152; Walter A. R. Schmedt, 4153; T. J. Dawkins, Jr., 4212; Walter L. Kurlfink, 4252; Alphonse Jiron, 4511; Louis J. Price, 4511; Joseph C. Wynn, 4511; Dewey J. Stout, 7231; and F. R. Moon, 8240.

AEC Presents SNARE Reactor to LSU for Educational Purposes

Atomic Energy Commission has presented the Sandia SNARE Reactor (Sandia Nuclear Assembly for Reactor Experiments) to Louisiana State University.

SNARE, a surplus pool-type research reactor, has been used for low power experiments at the Laboratory. It has been producing neutrons at low levels (operation at one kilowatt of heat), but can be modified to operate at up to 5000 kilowatts.

The transfer was made through the Dallas Regional Office of the Department of Health, Education and Welfare (DHEW).

Making the reactor available to Louisiana State University is part of the AEC's program of providing nuclear education and training assistance to colleges and universities, and DHEW's program of making federal surplus property available to educational institutions.

SNARE was transferred to Sandia in late 1963 from the Commission's National Reactor Testing Station in Idaho where the reactor, then known as SUSIE, was operated as a shield facility in the aircraft nuclear propulsion program from 1959 to 1962.

Among the components turned over to LSU are the fuel core plate, control rods and actuating mechanisms, reactor bridge and supporting structures for control rod drive mechanisms and radiation detectors, and the control console.

The nuclear fuel will not be included in the transfer and the 16-foot-deep pool, which housed SNARE, will be used for the new Annular Core Pulse Reactor described in the Nov. 19 issue of the LAB NEWS.

LSU has indicated that the reactor will be installed as part of its Nuclear Science Center. Installation and operation of the reactor will be subject to licensing by the AEC.

SIGNING UP Mr. and Mrs. Ernesto Martinez (center) and Mr. and Mrs. Sam Sutherland (right) for the special health insurance plan, to supplement Medicare, is Norris Rose of Employee Benefits Division. One hundred retired employees attended a recent meeting at the Coronado Club and others are being contacted by mail or in person to learn details of the new medical coverage available to them.

WIRE GUN is used by Fidel Chavez (4221-2) to flame spray a cylinder with high carbon steel. The process is equally suitable for applying thin coats or for resurfacing worn parts. Various combinations of ceramics and metals are possible.

Coatings of Metals and Ceramics Possible With Flame Spray Guns

"Flame spraying"—a method of applying metals and ceramics to usually nonadherent surfaces—has been used at Sandia on a variety of jobs ranging from high friction parts for rocket sleds to miniaturized switches.

The spraying of molten metal dates back to the turn of the century when liquid lead was poured in front of an air blast to form a lead powder which would create a thin coating on some surfaces. The commercial application didn't become popular in the United States until the early 1930's when the metallizing process proved to be a quick and inexpensive way to repair worn machine parts and to apply corrosion resistant coatings.

Now through improved processes, materials with insulation and thermal shock barrier characteristics can be applied in thin coats in many metal and ceramic combinations to meet space age demands for high strength versus light weight.

Fidel Chavez of Project Assembly and Heat-Treat Section 4221-2 does most of this type work at Sandia Laboratory in a specially soundproofed room in Bldg. 855. George Mancuso helps when the work load is heavy. Both were trained by their supervisor, H. E. Payne.

There are three types of flame spraying guns available: one creates metallic spray from rolls of wire fed into the back of the gun; another uses rods of different ceramic material (such as aluminum oxide, zirconium oxide, and chromium oxide); the third, the plasma flame gun, is fed metals or ceramics in powder form.

The plasma flame gun operates on argon gas which becomes ionized when struck by a high frequency electric current. Temperatures of 12,000 to 20,000°F. within the gun melt the ceramic or metallic powder; however, the heat drops rapidly as the spray leaves the nozzle under force.

The wire gun and the rod gun both operate on oxygen, acetylene, and air which are adjusted to correct proportions by studying the color of the flame—the same as in welding.

With the wire gun, copper can be sprayed on wood at temperatures below 200° without charring the latter. On the other hand, pure tungsten with a melting point of 7000° can be broken down into a spray in the plasma flame gun. A recent job called for coating a stainless steel pressure test probe with pure tungsten.

In most cases a coating of $\frac{1}{32}$ of an inch is sufficient. If the coating is thicker, there is the danger of cracking during expansion and contraction. Grooving the surface of the material being coated prevents this to some extent.

Prior to metal spraying, most items are passed through a degreasing unit, blasted with an abrasive to improve bonding properties, and then are heated to prevent condensation. After the spraying, the item may be ground to achieve a smoother finish although some materials atomize finer than others making this step unnecessary. Diamond wheels are used to grind ceramic materials.

The process has been applied at Sandia for building up a 16-inch-diameter valve with corrosion-resistant stainless steel for use in one of the wind tunnels; to spray coatings on batteries which would be damaged by temperatures over 300°; and to place a ceramic insulation on the shaft of a ⅛-inch-diameter rotary drum switch, which was then topped with a thin layer of copper upon which a printed circuit was etched. These are a few examples of varied applications possible with the process. Engineers interested in trying new or unusual uses or combinations are invited to call Mr. Payne at tel. 264-1838.

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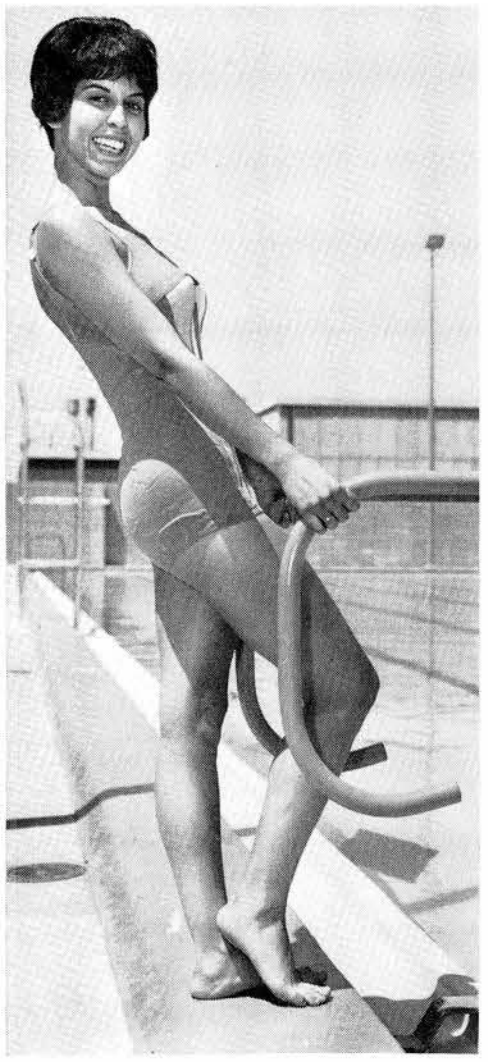
LIVERMORE NEWS



"C'MON IN, the water's fine!" says Viola Rael (8235-2) at the LRL pool.

LRL Swimming Pool Available to Sandians

The 1966 swimming season is underway at the LRL olympic-sized pool. To participate, employees must join the Lawrence Radiation Laboratory Recreation Association (RLRA), and purchase either a season ticket or pay a single admission fee each time they swim.

Sandians, as well as LRL employees, are eligible to join the RLRA and may enroll themselves and their families. However, noontime swimming is limited to employees.

Surrounding the pool are barbecue and picnic areas, basketball and volleyball courts, and a wading pool for youngsters.

Several improvements have been made to the pool facilities since last year's season. The weatherbeaten structure which enclosed the pool has been removed, thus providing outdoor swimming. In addition, an eight-foot concrete wall has been built to the north and west for wind protection, and the locker room building has been renovated.

Memberships

Family membership	$25
Individual membership	15

Single Admissions

Adult	$ .50
Adult (noontime)	.25
Children	.25

10-Ticket Guest Card

Adults	$ 4
Children	2

Swimming lessons for both children and adults are being offered again this year.

The pool schedule is 1-8 p.m. daily with noontime swimming (for employees only) Monday through Friday.

Livermore Notes

H. A. Krieger (5510) addressed the Ground Warfare Session of the 17th Military Operations Research Symposium (MORS) held at the U. S. Naval Postgraduate-School, Monterey, Calif., May 23-25. The subject of this year's symposium was "The Role of Operations Research in Matching Operational Capability and Military Requirements." Mr. Krieger spoke on "The Effectiveness of Tactical Atomic Demolition Munitions (ADM) Vehicle Barriers." MORS is sponsored by the Office of Naval Research, Washington, D.C.

* * *

Vince Peterson (8222) shot a new low score of 62 to win the first place trophy in the Sandia Employee Golf Club tournament on May 21. The straight handicap tourney was played at the Lake Chabot Golf Course in Oakland.

Don Gregson (8130) and Marshall Meyer (8133) tied for second place with net scores of 65. A special award was won by Don Skinrood, Jr., (son of Don Skinrood, 8118) for coming closest to the pin at the ninth hole.

* * *

Forty-eight members of the Del Valle Skilaufers left their snow skis at home when they recently canoed down the Russian River from Cloverdale to Healdsburg. Seventeen canoes were used by the group on their weekend camping trip.

Sandians on the trip included Keith Banko (8132), Tom Brumleve (5510), Al Campbell (8127), Bud Herzog (8154), John Liebenberg (8156), Clarence (8127) and Alyce Loveless (8252).

Bob Mason (5510), Marshall Meyer (8133), John Negrych (8133), Ron Puckett (8252), Jim Rego (8134), Bob Schultz (8124), Clyde Seibel (8252), and Roger Woodbury (8134). Information regarding future plans and jaunts may be obtained from club president, Jim Rego, tel. 447-8899.

Wedding

June Takahashi and John Ferreri were married June 4 in an afternoon ceremony at Asbury Methodist Church in Livermore. After a church reception, the couple left for a wedding trip in the Reno and Lake Tahoe area. The couple is now residing in Livermore. June has worked in Secretarial Services Section 8235-2 since joining Livermore Laboratory four months ago.

Welcome Newcomers

April 22 - June 2

California

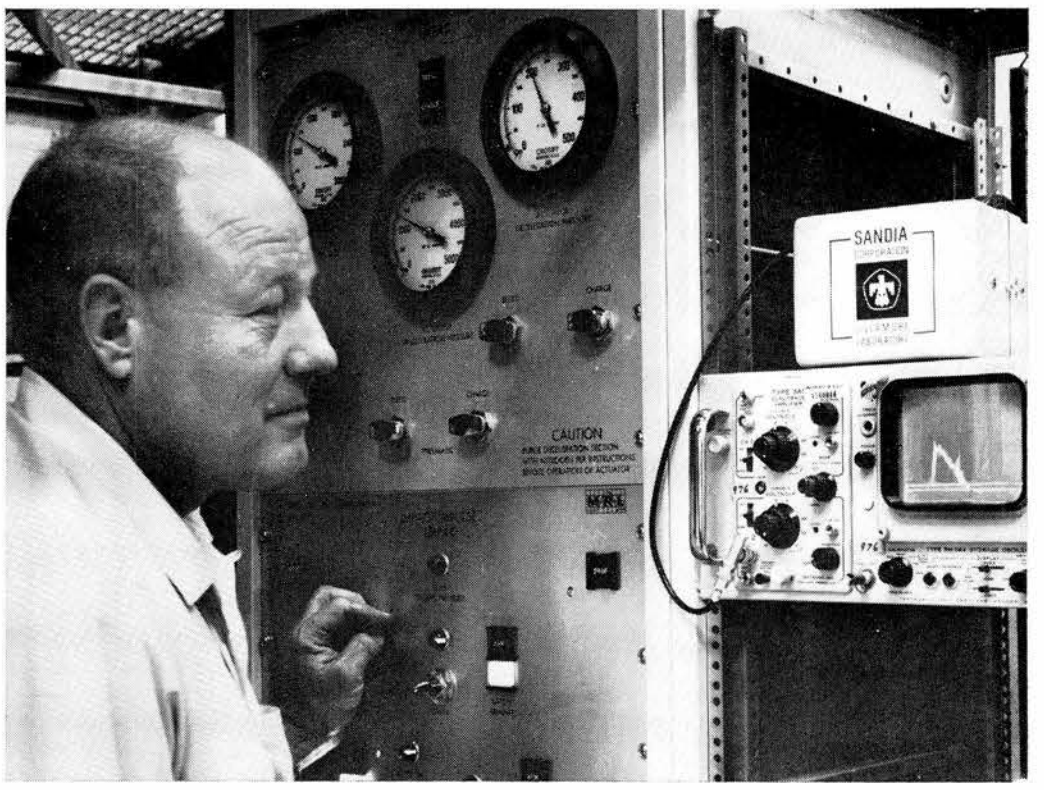
Jerry M. Alcone, Albany	8153
*Harry P. Farmer, Livermore	8168
Thomas A. Gleason, Mill Valley	8233
Victor C. Krause, Los Gatos	8223
Keith A. Oatney, Livermore	8235
Johannes M. Peppelaar, Hayward	8222
William M. Rego, Livermore	8222
Harriett L. Sitton, Livermore	8235
Barbara A. Stephens, Livermore	8235
Beth A. Williams, Hayward	8232

Returned from Leave

Melba A. Purvis, Livermore	8253

*Denotes rehire

A COMMUNITY SERVICE AWARD was presented to C. R. Barncord (8120), center, last week in recognition of his outstanding contribution as general chairman of the recent successful fund raising campaign for the Valley Memorial Hospital expansion program. The award was presented by R. C. Becker (right), chairman of the Campaign Steering Committee, in the office of B. S. Biggs (left), vice president 8000.



INITIAL-PEAK SAWTOOTH PULSE appears on the oscilloscope screen at the shock testing machine console, operated by A. W. Clark, Environmental Test Division I, 8112.

Unique Shock Testing Machine in Operation at Livermore Laboratory

A new shock machine with unique impulse capabilities in addition to normal impact features has been added to the environmental test facilities at Livermore Laboratory.

According to F. J. Maloney, supervisor of Environmental Test Division I, 8112, the machine can be used in several operating modes, functioning either as a conventional drop machine (both free fall and accelerated drop) or as an impulse device. It is located in Bldg. 972, one of the hazardous test buildings in SCLL's Area 8.

Basic purpose of the shock testing machine is to generate shock pulses for testing components and systems to their expected environmental limits.

The machine can handle specimens up to 70 inches high, with a maximum total weight (including test specimen, table, and fastening fixtures) of 1000 pounds in free-fall impact. The 24-inch-square table with its test specimen rides up and down on two vertical guide rods.

The impulse device provides the unique capability for an initial-peak sawtooth pulse in addition to normal shock pulses associated with a conventional drop machine. An initial-peak sawtooth pulse is difficult to generate.

For accelerated impact tests, rubber shock its specimen is accelerated upward by a piston. The piston is driven by hydraulic oil which receives energy from the sudden release of compressed nitrogen. A separate chamber of nitrogen in front of the piston is compressed by the upward thrust, causing the piston to stop.

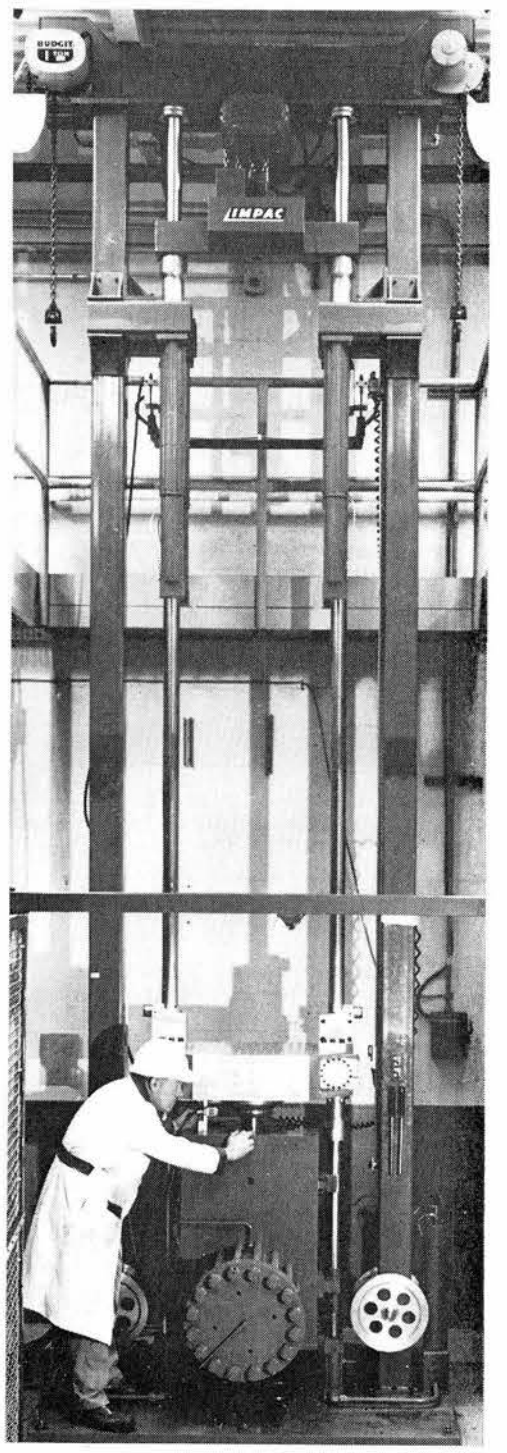
For accelerated impact tests rubber shock cords are attached to the table. The specimen and table are drawn upward, stretching the shock cords. When released, the table and specimen are "snapped" downward (much like the action of a slingshot used vertically). In free fall tests, the table and specimen are drawn upward (with no shock cords attached) and merely drop from a given height.

The table is equipped with a rapid-response hydro-pneumatic brake system which is used in both impulse and impact operation. It prevents secondary impacts during impact tests, and stops the table after the pulse in impulse tests.

The shock test machine is equipped with an extensive system of safety interlocks. In addition, an interlock circuit has been provided which requires that the door to the safety screen around the machine be closed during operation.

Monterey Research Laboratory, Inc., Monterey, Calif., (using the trade name "Impac") designed and built the machine according to Sandia specifications by incorporating the impulse device into one of its existing shock testing machines.

C. H. Seaborg, Project Engineering Division 8168, formerly of Environmental Test Division I, 8112, was project engineer for installation of the machine, assisted by A. W. Clark and J. A. Duggar (both of 8112). The original specification for the machine was written by R. A. Thompson of Instrumentation System Development Division 8122, formerly of Division 8112.



22-FOOT SHOCK TESTING MACHINE is checked by A. W. Clark prior to an impulse test in which the table and specimen will be accelerated upward.

H. K. Onstott Retires; G. Accettura New V. P. Of Bell Telephone Labs

H. K. Onstott

Howard K. Onstott, a member of Sandia's Board of Directors and vice president and general manager of Bell Telephone Laboratories, will retire on July 1.

Guy Accettura, who has been vice president — customer planning division, Western Electric Co., has been named to replace Mr. Onstott as BTL's vice president and general manager.

Mr. Onstott joined WE's Hawthorne Works as a member of the student training course in 1924. In 1952 he became assistant vice president in charge of general staff of Bell Telephone Laboratories. He was named vice president in charge of personnel of American Telephone and Telegraph Company in 1956. He was elected to the post he now leaves in January 1961.

Mr. and Mrs. Onstott, who now make their home in Short Hills, N. J., plan on moving to Carmel, Calif., after his retirement.

(Continued from Page One)

Adhesives Lab Solves Problems

must be bled off to maintain the bond, or else the structure must be made strong enough to contain the gas.

"These are interesting problems," Nick says. "We try to come up with more than one solution and run tests to determine the best answer."

On Nick's desk is a faded color picture of some Oriental dolls. The picture is unimportant, but the frame might be a historical first. It is clear lucite bonded together with epoxy resin, one of the first applications ever made with the substance.

Nick made the frame back in 1946 when he was employed in the plastics laboratory of the National Bureau of Standards, Washington, D. C. The laboratory played a part in the early evaluation of epoxy resins and the many variations of plastics and adhesives which followed.

Nick came to Sandia in 1956, and has continued his specialty interest in synthetic resin applications with particular emphasis on adhesives. Through publication of numerous technical papers in the IEEE TRANSACTIONS ON PARTS, MATERIALS, AND PACKAGING and other journals, Nick has achieved a national reputation as an authority on adhesives.

He is a member of the American Society for Testing and Materials and chairman of ASTM's national committee D-14 on adhesives, which is an organization primarily concerned with developing and writing test methods and specifications on adhesives.

Orelio Montoya (1133) assists Nick in the Adhesives lab. Another expert on adhesives applications, he has compiled a small mountain of data on their use at Sandia, a file which touches parts of most Sandia projects.

In addition to solving specific applications problems, the laboratory conducts research programs into the properties of adhesives. The lab is not concerned with new formulations, but the characteristics and applications of available adhesives.

Some of the current work includes evaluation of high temperature (up to 2000°F.) characteristics of adhesives for reentry vehicles, effect of outdoor aging on sealants, and evaluation of primers for use with adhesives and sealants.

Some of the more challenging applications have included contributions in terms of ablative shield assemblies and aluminum honeycomb construction for parachute container structural parts.

When used properly in lightweight structures, adhesives make possible bonded metal assemblies which use the total strength of the material, since the adhesives fasten to every increment of the metal surface. It is a fabrication technique finding widespread use in the missile and aircraft industries.

"Adhesives are an integral part of modern technology," Nick says. "Our job is to keep up in a rapidly advancing field."

Sandia Authors

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W. J. O'Sullivan and J. E. Schirber (both 5151), "Application of a Modified Lifshitz and Kosevich Expression to the Determination of the g Factor in Metallic Zn," April 18 issue, PHYSICAL REVIEW LETTERS.

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Bruno Morosin (5151), "Lattice Parameters Between 5° to 298° K and Crystal Structure at 5°K of Cobalt Chloride Dihydrate," January issue, JOURNAL OF CHEMICAL PHYSICS.

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Albert Narath (5150) and Donald Alderman (Sandia 1965 summer hire), "Nuclear Spin Relaxation in Molybdenum Metal," Vol. 143, PHYSICAL REVIEW; Albert Narath, A. T. Fromhold and E. D. Jones (both 5151), "Nuclear Spin Relaxation in Metals; Rhodium, Palladium, and Silver," Vol. 144, PHYSICAL REVIEW; Albert Narath, D. E. Cox, G. Shirane, and B. C. Frazer, all Brookhaven National Laboratory, "Neutron Diffraction Determination of the Intermediate-Field Magnetic Structure of $CoCl_2 \cdot 2H_20$," March issue, JOURNAL OF APPLIED PHYSICS; with J. E. Schirber (5151), "Effect of Hydrostatic Pressure on the Metamagnetic Transitions in $FeCl_2 \cdot 2H_20$, $CoCl_2 \cdot 2H_20$, $FeCl_2$ and $FeBr_2$," March issue, JOURNAL OF APPLIED PHYSICS.

D. E. Munson and L. M. Barker (both 1115), "Dynamically Determined Pressure-Volume Relationships for Aluminum, Copper, and Lead," March issue, JOURNAL OF APPLIED PHYSICS.

L. S. Nelson (5234), "Possible Role of Super-cooling in the Spearpoints Observed During the Combustion of Zirconium Droplets," Vol. 210, page 410, NATURE.

Ruth E. Whan (5211), "Oxygen-Defect Complexes in Neutron-Irradiated Germanium," May issue, JOURNAL OF APPLIED PHYSICS; "Optical Properties and Thermal Behavior of New Absorption Bands in Silicon Irradiated at Low Temperatures," March 15 issue, APPLIED PHYSICS LETTERS.

L. F. Shampine (5426), "An Inequality of E. Schmidt," March issue, DUKE MATHEMATICAL JOURNAL; "The Condition of Certain Matrices," Oct.-Dec. issue, JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS; "Note on a Paper of Bailey and Waltman," forthcoming issue, ARCHIVES FOR RATIONAL MECHANICS AND ANALYSIS.

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P. B. Rand (1113), "Differential Thermal Analysis of Flexible Urethane Foams—I. Transitions and Their Effect on Stress-Strain Properties," May issue, JOURNAL OF CELLULAR PLASTICS.

R. A. Hill (5122) and R. D. Fellerhoff (5141), "A Dual Recording, Variable Range, Rapid Scan Spectrometer; A Comparison of Simultaneously Recorded Stark-Broadened H-alpha and H-beta Line Profiles," July issue, JOURNAL OF APPLIED OPTICS.

C. J. McGarr (4600), "How Poor Is Poor?" May issue, INDUSTRIAL NEWS.

Deaths . . .

Edward C. McNeely, a staff member in Product Tester Design Division, 2453, died on Friday, May 27, after an illness. He was 51.

Mr. McNeely had been employed at Sandia Laboratory since August 1952.

He is survived by his widow and one daughter, age 17, of Albuquerque, and his mother who resides in Phoenix.

* * *

Delfino Lopez, a retired Sandia employee, died suddenly May 29 in Tucumcari. He was 78.

Mr. Lopez retired in January 1956 after five years at Sandia. He was a janitor.

Survivors include three children, 16 grandchildren, and 23 great-grandchildren.

* * *

William Schober, a scheduling clerk in Maintenance Control Division 4517, died suddenly June 2. He was 60.

Mr. Schober had been employed at Sandia Laboratory since January 1961.

He is survived by his widow, eight sisters, and four brothers.

* * *

Alice M. Stephenson, a service clerk in Design Information Services Division 2234, died June 2 after an illness. She was 46.

Mrs. Stephenson had worked at Sandia Laboratory since February 1956.

She is survived by her husband, and her mother who resides in Philadelphia.

* * *

John F. Russell, an electrical engineer in Electronic Component Evaluation Division 2131, died suddenly June 9. He was 43.

Mr. Russell had been employed at Sandia since September 1952.

He is survived by his widow and four sons.

* * *

Arthur E. Johns, a mechanical inspector in Inspection and Standards Division 4213, died June 12.

He was 61 years old and had been a Sandia employee since March 1949.

Mr. Johns is survived by his widow, two sons, a daughter, his mother, one brother, and five grandchildren.

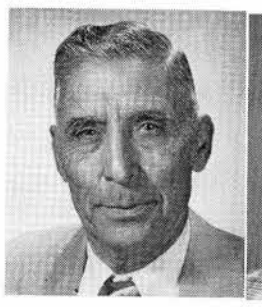
* * *

Walter H. Burns, a retired Sandia employee, died May 23 after an illness. He was 72.

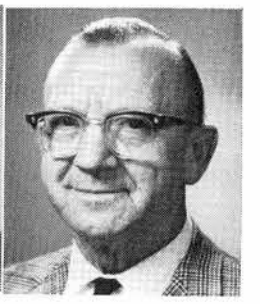
Mr. Burns retired from Sandia in April 1959. He had worked since October 1948 as a stockkeeper in the Development Shops.

Survivors include his widow, two sons, two daughters, and ten grandchildren.

Edward McNeely

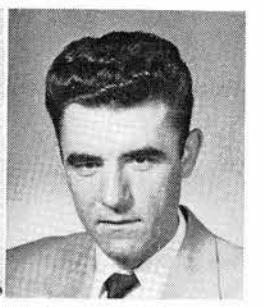


Delfino Lopez



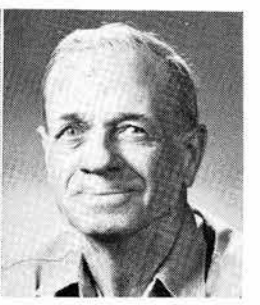
William Schober

Alice Stephenson

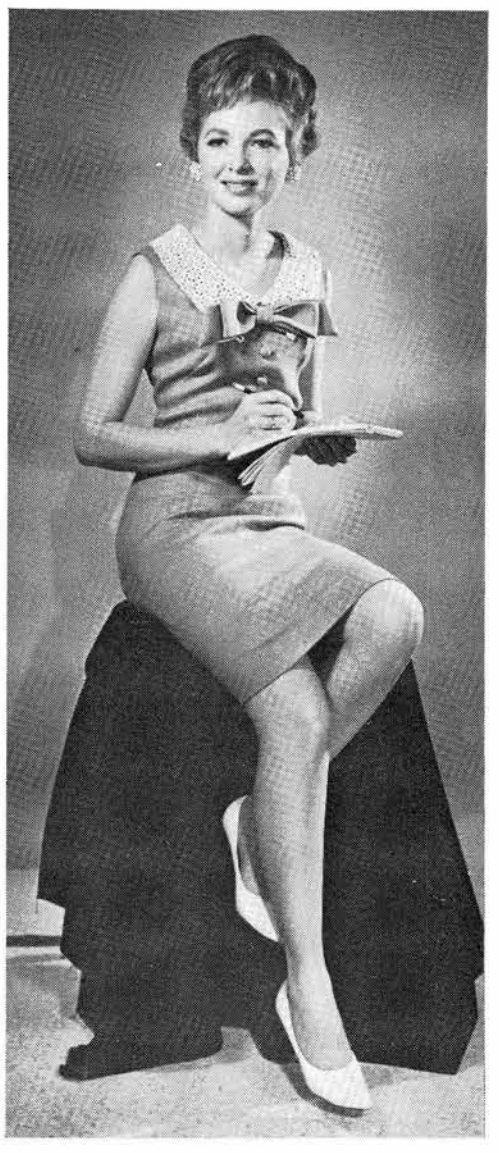


John Russell

Arthur Johns



Walter Burns



Mary Remillard (5232)

Take A Memo, Please

When camping during the summer be aware of everyday hazards, such as broken glass and nails, as well as those particular to the season or location.

Take Note

H. G. Jeblick (2431) was honored by two local organizations recently.

Members of the American Ordnance Association, Albuquerque Chapter, elected him to the board of directors (he is already a life member). In addition, Maj. Gen. D. E. Hooks (ret.) appointed Mr. Jeblick to the executive council of the Air Force Association, Albuquerque Squadron.

* * *

"Possible New Open Orbits in the Fermi Surface of Zinc" is the title of a technical paper by J. E. Schirber (5151) which appears in the Proceedings of the International Conference on Low Temperature Physics. The book was published by Plenum Press and is based upon presentations made at a meeting in Columbus, Ohio, in September 1964.

* * *

M. L. Dawson of Systems Engineering—Production Division 1521 was notified recently that he has been appointed to honorary membership in Pi Tau Sigma, mechanical engineering honorary fraternity at the University of Oklahoma. He graduated from the University in 1957 with a BS degree in mechanical engineering.

* * *

Third place in a national competition among the 138 chapters of the American Society for Quality Control was awarded recently to the New Mexico Chapter. W. A. Sherman (2114), newly-elected chairman, accepted the award on behalf of the local group during the national ASQC convention in New York.

* * *

Any youngsters interested in joining the Coronado Club's swim team diving group are urged to contact Del Olson (1510), tel. 898-0585. The group is currently expanding its diving activities and new members are needed. Experience is not necessary — the swim team coach will provide instruction.

Show an Easterner a Wilderness And He Might Like the Silence

Compare the hustle and bustle, polluted air, and unending noise of a large Eastern city with the miles and miles of unpopulated wilderness which abounds with trout streams and herds of elk. It's then easy to see how Ken Kerns came to be known as "that horse wrangler with the Boston accent."

During the week, Ken is administrative assistant to the Director of Field Testing. Evenings he sometimes shows his colored slides of wild flowers before interested groups—and that's the tip-off to his interest in the Pecos Wilderness. "My daughter and I went there the first time about eight years ago. I keep returning and returning," he explains.

The U. S. Forest Service attempts to retain the primitive nature of this 165,000-acre area in northern New Mexico (and similar areas throughout the United States) by banning motor vehicles (including motor bikes), power saws, and other signs of man-made civilization. Any trips through the wilderness area have to be made on foot or on horseback. Since the entrance to the area (from Cowles) is only a 100-mile drive from Albuquerque, Ken frequently spends weekends in the mountains, or sometimes only a day.

Both the Forestry Association and The Wilderness Society sponsor 10-day trips each year through the Pecos Wilderness, and it is on these excursions that Ken works as an unpaid wrangler while the guests pay to see the same scenery.

Getting ready for a scheduled trip usually involves pre-arrangements by the wranglers, such as setting up the first camp site and seeing that there is sufficient wood on hand. Guests bring only their personal belongings. Horses, pack mules, two-man tents, food, liniment are all included in the cost of the trip. Four different camp sites are normally used, and at the end of the first week, the wranglers take the pack mules back to base camp to replenish food supplies and pick up any items requested by the guests.

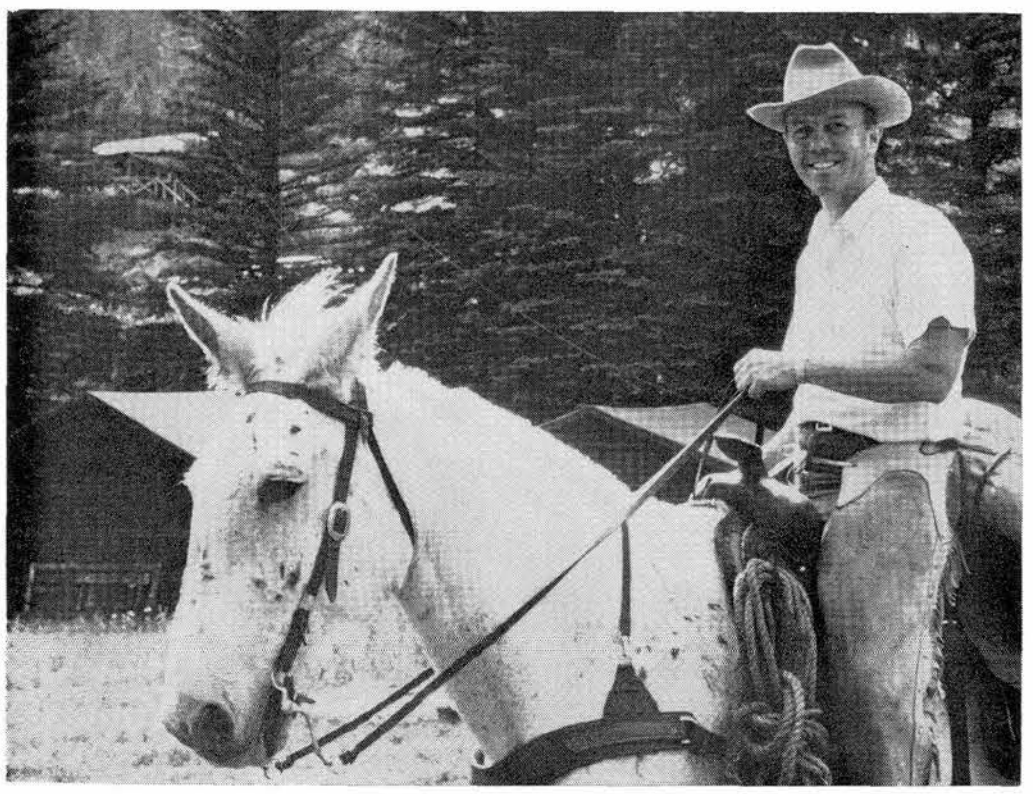
Ken is usually the first man up in the morning. He starts the fire, arouses the kitchen help, and then goes out with other wranglers to round up the 60 or 70 horses and mules (only a few of the animals are hobbled), and saddle the riding horses. By the time he returns, the guests have had their breakfast and are ready to ride to one of many fishing streams or perhaps to a scenic outlook of the Truchas Peaks which dominate the whole area. In this rugged country, distance isn't measured in miles. It's measured in the time it takes to go up a hillside and down a valley to reach your destination.

At daybreak Ken has spotted large herds of elk—and has been able to get close enough to photograph them. He recently saw one herd of 50 animals. Another time he came unexpectedly upon a cow elk. She fled into the woods but left beneath a tree her newly-born calf, which tried to press closer to the earth as Ken approached. He peeked, and left.

"One of the attractions of the Pecos Wilderness is coming abruptly out of dense forest into a grassy meadow," he recalls. "Some of these 'parks' are at better than 10,000 feet. And, in season, from the low point of the wilderness to the high meadows you'll find blue columbine growing wild."

Ken also helps hunters pack into the Pecos before the start of hunting season, and in previous years he helped the Forest Service make its annual elk count (it's now done by helicopter). "We'd report on how many elk we actually saw and also how many bull elk bugles we heard. From those statistics, the hunting limit for the season was determined," he says.

What's the big attraction? "When I lived in the East, I liked to go on sailboat cruises, perhaps from Marblehead to Halifax. The same perfect advance planning has to be made for trips into land wilderness. And no matter where I ride, there is always the different side of the mountain to see, or a hidden knoll to discover," he concludes.



PECOS WILDERNESS is frequent destination for Ken Kerns (3455/7200).

Sandia Speakers

J. D. Williams (1433), "Thin Film Microelectronics," Los Alamos subsection of the Institute of Electrical and Electronics Engineers, May 24, Los Alamos.

P. J. Chen (1116), "On the Attenuation of Acceleration Waves of Arbitrary Geometry in Isotropic Finite Linear Viscoelastic Media," Brown University Division of Applied Mathematics, May 24, Providence, R.I.

G. L. Eggert (1123), "The Influence of Reactor Irradiation on Gage Block Stability," National Bureau of Standards Gage Block Manufacturers Meeting, May 27, Gaithersburg, Md.

D. P. Peterson (5253), "A Stockpile Reliability Model Incorporating Feedback," Western Regional Meeting, Operations Research Society of America, June 13-14, Lake Tahoe, Calif.

E. S. Roth (2565), "Dimensioning," annual instructor development program (sponsored by the Colorado Vocational Association and State Board for Vocational Education), June 14, Fort Collins, Colo.

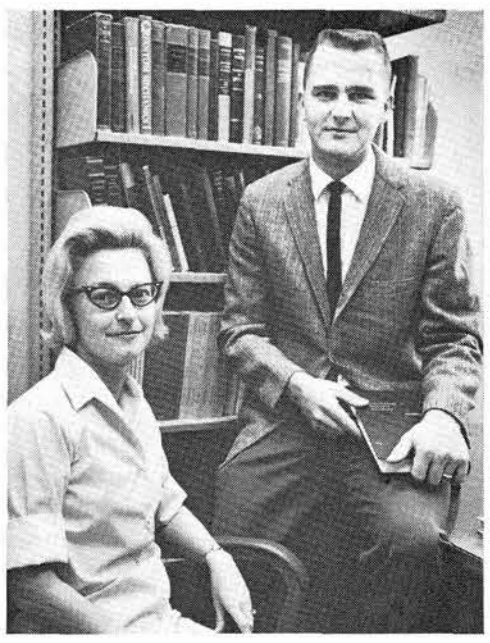
R. E. Luna (5234), "A Study of Directly Impinging Axi-symmetric Jets," Fifth U.S. National Congress on Applied Mechanics, June 14-17, Minneapolis, Minn.

K. J. Touryan (9326) and W. S. Saric (on leave of absence), "A Generalized Magnetohydrodynamic Entrance Flow Model," Fifth U.S. National Congress of Applied Mechanics, June 14-17, Minneapolis.

M. M. Sluyter (9321), "The Flow Field and the Oscillatory Convection of an Electrically Conducting Fluid Between Two Oscillating Vertical Flat Plates," Fifth U.S. National Congress of Applied Mechanics, June 14-17, Minneapolis.

D. G. Schueler (1433), "Cleaning Methods for Ferroelectric Ceramics," ASTM Symposium on New Analytical and Diagnostic Techniques for Electron Devices and Materials, sponsored by the Subcommittee on Control of Contaminants, June 14, Chicago.

A. L. Roark and W. E. Warren (both 5261), "The End Effect in Semi-Infinite Transversely Isotropic Cylinders," Fifth U.S. National Congress of Applied Mechanics, June 14-17, Minneapolis.



GRADUATE DEGREES were awarded Sharon (5263) and Marvin Daniel (2442) during recent commencement exercises at Oklahoma State University.

Husband and Wife Both Awarded Advanced Degrees

A husband and wife working simultaneously on advanced college degrees, that's togetherness.

Sharon and Marvin Daniel received MS and PhD degrees, respectively, at Oklahoma State University last month.

Marvin, who is now assigned to Division 2442, attended Arkansas City Junior College and received his BS degree in electrical engineering from Kansas State University. He was hired by Sandia in February 1961, completed the Technical Development Program, and received his MS degree from the University of New Mexico. In September 1963 he was granted a leave of absence to work on his doctorate. His dissertation was on "State-Space Synthesis of Passive One-Part Networks."

Sharon's scholastic background is a bit more varied. She attended the same junior college as her husband, was a part-time student at Kansas State, took summer semester courses at Wichita State University and evening courses at UNM. When she received her BS in mathematics from Oklahoma State in May 1965, Sharon already had seven hours of graduate study to her credit. By carrying a maximum load, she was able to complete requirements for her MS in education (mathematics) by midterm 1966. She worked for Sandia from March 1962-September 1963 and was rehired last January for assignment to Division 5263.

Both agree it was probably easier doing graduate study while they were still accustomed to attending classes and studying rather than waiting a few years.

Six Fires Cause $578 Property Loss Since January 1

Six fires at Sandia Laboratory during the first five months of 1966 have resulted in property loss of $578, according to R. W. Cohrs (4544), fire prevention engineer.

First fire of the year was on April 12. A janitor found a small fire in progress at 8:10 p.m. on the south mezzanine of Bldg. 840. A cardboard carton was burning and scorching the paint on the wall. The janitor extinguished the blaze. Property loss was $5. A discarded match was the probable cause of the fire.

On April 27, a small electric motor on a hydraulic press caught fire in Bldg. 805. Cause was improper fusing. Property loss was $49.

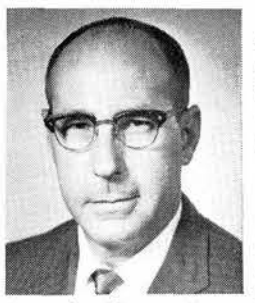
On May 4, an environmental test chamber overheated and caused damage amounting to $169. The high temperature limit switch was not connected into the control circuit.

On May 26, a small boiler exploded in Bldg. 901 and caused damage amounting to $45. The control wiring to the pilot lights had shorted out, the lights had been blown out by a draft, and the natural gas collecting from the leakage was ignited from the flame of a hot water heater.

On May 27, welding sparks caused a fire in the wooden deck on top of the water cooling tower on the roof of Bldg. 806. Loss was $300.

The next day, a wooden platform north of the steam plant, Bldg. 605, caught fire. Probable cause was a carelessly discarded cigarette. Loss was $10.

Supervisory Appointments

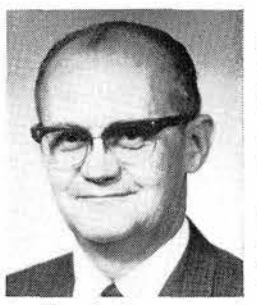


WILLIAM D. ULRICH, JR., to supervisor of Systems Engineering - Special Projects Division 1523, effective June 1.

Bill joined Sandia in June 1955 as a project engineer in support of several Navy weapon systems in the systems development organization. In December 1960 he was promoted to supervisor of the aircraft compatibility section. Five years later he transferred to Preliminary Design Support Division.

Bill received his BS degree in mechanical engineering from the University of Arizona in June 1955.

He served with the Marine Corps for three years during World War II, mainly in the Pacific area as an aircraft mechanic. He is a member of Theta Tau and Tau Beta Pi.



THOMAS N. EARP to supervisor of Dabob Bay Operations Section 7223-3, DOD Range Operations Division, effective June 1.

Tom has been at Sandia since December 1948 and was assigned for the first 10 months to Road Department, which was responsible for assembly of parts of nuclear weapons. He then transferred to Salton Sea Test Base in California where he remained for 10 years working with radar and the weather station. After the facility at Salton Sea was closed, Tom transferred to Tonopah Test Range in Nevada where he continued to work with radar and developed the low altitude bombing control unit. He has been stationed at Dabob Bay, Wash., for two years.

He attended Pacific State University in Los Angeles, and served nearly four years in the Air Force during World War II.

JIM ARNOLD to supervisor of Data Processing Section 9212-1, newly created to process data on JTF-2 tests at an off-base location, effective June 1.

Jim joined Sandia in January 1956 as a test engineer in environmental testing. From March 1959 until he transferred to Data Handling Systems Division 9212 in September 1965, Jim was a section supervisor and project leader in environmental testing.

Before coming to Sandia he was with General Services Administration in San Francisco for eight months and the Corps of Engineers for six years.

Jim received his BS degree in electrical engineering from the University of New Mexico where he was a member of Phi Theta and Sigma Tau.

Events Calendar

June 17-19—New Mexico Arts and Crafts Fair, Old Town Plaza.

June 17-19, 24-26—Shaw's "Candida," Corrales Adobe Theater, 8:30 p.m.

June 18—Climb to Santa Fe Baldy. N. M. Mountain Club, leader Bruce Benedict, tel. 299-9006.

June 18-19—All-Arabian Horse Show, Tingley Coliseum.

June 19 and 22—June Music Festival, Albuquerque Little Theater, 8:15 p.m.

June 22-26—One-act plays, "No, But I Learned to Dance the Samba!" and "Why Fall in Love, There's Always Insanity," Old Town Studio, 1208 Rio Grande NW, tel. 242-4602 for reservations.

June 24—San Juan's Day dances at Taos, San Juan, Isleta, Cochiti, Santa Ana, Laguna, and Acoma pueblos.

June 27—UNM Lecture Under the Stars, John Furbay on "Survival in a Divided World," 8 p.m., administration building.

July 2-4—YWCA trip to Canyonlands National Park. Non-members welcome. For reservations, tel. 247-8841.

July 2—Puccini's "Tosca" at the Santa Fe Opera.

Albert Einstein -

THE SCIENTIST AND THE MAN

By C. C. Hudson (5590)

Part III

By 1916, Einstein had published 100 papers in scientific journals, an average of about seven per year. The first had appeared the year he finished college (1901), and several appeared each year until 1905, when his big ideas began coming. His first papers—and many of the later ones too—were concerned with thermodynamics, heat, and molecular motion, because these subjects were very popular in those days. Like Planck, Einstein wasted time deriving results which, unknown to him, had already been obtained by the American, Gibbs. However, his main efforts were directed toward the relativity theory, gravitation, and light. The results of these researches are so thoroughly embedded in present-day scientific thought that Einstein's originating role is sometimes forgotten. We remember $E = mc^2$ and relativity because they have been popularized, but many of us are not aware that the concepts leading to television image tubes, laser beams, noise in radio circuits, and metallurgy were also Einstein's discoveries.

New Mental Outlook

In his beginning days of advanced study, Einstein realized, by some wonderful intuition, that to make a new discovery requires not so much hard work as a new mental outlook. Therefore, he devoted endless hours to reading and thinking about the philosophy of science. He became suspicious of the prevalent 19th Century trust in Newtonian mechanics, and he embraced the ideas of Poincaré and Mach.

Einstein wrote Newton was probably the first to reveal, in his theory of sound transmission, the efficacy of partial differential equations. Euler had already created the foundations of hydrodynamics. But the most precise development of the mechanics of discrete masses, as the basis of all physics, was the achievement of the 19th Century. What made the greatest impression on the student, however, was less the technical construction of mechanics as the solution of complicated problems than the achievements of mechanics in areas which had apparently nothing to do with mechanics: The mechanical theory of light, the specific heat of gases, the kinetics of gases, and especially the heat conduction and diffusion of gases which also furnished the absolute magnitude of the atom . . . .

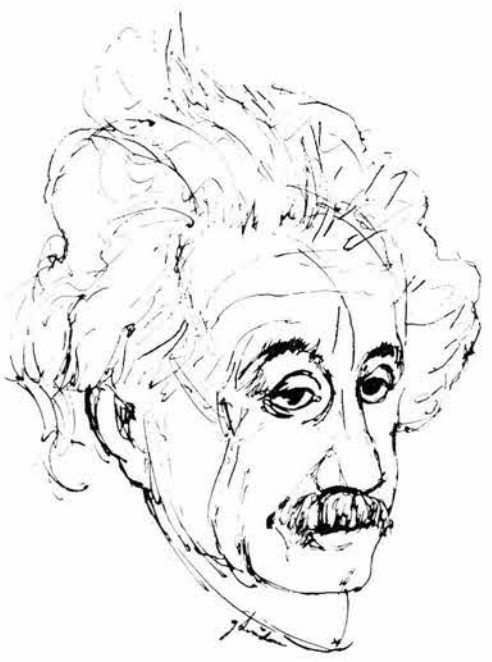
"We must not be surprised, therefore, that, so to speak, all physicists of the last century saw in classical mechanics a firm and final foundation for all physics; yes, indeed, for all natural science, and that they never grew tired in their attempts to base Maxwell's theory of electromagnetism, which, in the meantime, was slowly beginning to win out, upon mechanics as well. Even Maxwell and Hertz, who in retrospect appear as those who demolished faith in mechanics as the final basis for all physical thinking, in their conscious thinking adhered throughout to mechanics as the secured basis of physics. It was Ernst Mach who, in his HISTORY OF MECHANICS, shook his dogmatic faith; this book exercised a profound influence on me while I was a student."

Thus it was that Einstein, when confronted with two complete, but entirely separate, theoretical formations—Newton's theory of mechanics and Maxwell's theory of electromagnetism—rejected Newton and made Maxwell the basis of his relativity principle.

While at the Zurich Academy, Einstein had become intrigued by the Michelson-Morley experiment and wanted to attempt it himself. His superiors, probably recognizing the enormous specialized skills and apparatus that would be required, had refused to allow it. The idea, however, continued to excite him, and out of this interest grew the special theory of relativity.

Wave Motion

The mechanical theory of light, like the mechanical theory of sound, was built on the concept of an undulatory (wave) motion through a medium. Since the notion of wave motion is going to be of crucial interest to the rest of this discussion, it is perhaps useful to remind the readers of the basic ideas. Waves are most readily



Albert Einstein probably most closely fits the public image of a scientific genius. A versatile and profound scientist, his most famous theories relate to relativity, gravitation, and light.

This is the third of a four-part series about Einstein — As a Man — and His Works.

observed on the surface of a liquid. When a stone is dropped in a pool of water, one can see a set of crests and troughs which move away from the center.

If a cork is placed on the water, it moves up and down with the wave, but does not move in the direction the wave is going. The height the cork rises or falls is called the amplitude of the water wave; and the distance between successive crests is called the wavelength. If we were to observe the number of times per second the cork moved up and down, this would give us the frequency of the wave. From these three measured quantities, we can deduce that the speed with which the wave travels is the product of the wavelength and frequency; and that the energy propagated by the wave is proportional to the square of the amplitude.

There are many types of waves which exist in many different media. The transmission of energy, by wave motion is one of the principal ideas of modern science and has applications far too numerous to mention here. The important thoughts to bear in mind just now are that a wave motion has always been thought to require an elastic medium, and that the motion of the wave is always relative to the medium in which it propagates. A little later, we shall discuss other properties of waves.

Aether in Space

Sound waves propagate through solids, liquids, gases, and all other states of matter by the process of each molecule communicating to the next one an increment of momentum while at the same time being restrained to return to its initial position by the intermolecular forces of the medium. Since light can propagate through a vacuum, while sound cannot, it was postulated that electromagnetic disturbances moved in a medium which was not tangible, but which pervaded all space, penetrating even into solids. This medium was called the aether, and Einstein wrote that "It had to lead a ghastly existence alongside the rest of matter, inasmuch as it seemed to offer no resistance whatever to the motion of 'ponderable' bodies. In order to explain the refractive indices of transparent bodies, as well as the absorption and emission of radiation, one would have had to assume complicated reciprocal action between the two types of matter, something which was not even seriously tried, let alone achieved."

Common sense required that if the aether existed (and how else could light get to us from the sun and stars?), then it must permeate all space and be at rest with respect to some point in the universe. If the earth were not that unique point, and this idea had been given up with Copernicus, then the earth must move relative to the aether. If the earth moves through it, then light waves propagating in one direction will not have the same speed relative to the earth as light waves propagating in another. The Michelson-Morley experiment showed that, in whichever way one looked, light propagated with the same speed. (Actually, this famous experiment by itself was not able to demonstrate this important conclusion, but it is usually given the credit.) Lorentz, in 1895 (and Fitzgerald, perhaps as early as 1890 in lectures), published a technique by which one could understand the experiment by artificially shortening all measurements in the direction of motion. In 1904, Lorentz attempted to formalize his empirical result in a second paper, and while the ideas of the "Lorentz contraction" were greatly expanded, the fundamental concepts eluded him. Einstein was a great admirer of Lorentz and knew of the first paper, but was unaware of the second.

In 1905, Einstein wrote his now classic paper "On the Electrodynamics of Moving Bodies" in which he clearly stated two new principles: "(Experiments) suggest that the phenomena of electrodynamics as well as of mechanics possess no properties corresponding to the idea of absolute rest. They suggest rather that . . . the same laws of electrodynamics and optics will be valid for all frames of reference for which the equations of mechanics hold good. We will raise this conjecture (the purport of which will hereafter be called the 'Principle of Relativity') to the status of a postulate, and also introduce another postulate . . . namely, that light is always propagated in empty space with a definite velocity c which is independent of the state of motion of the emitting body." Thus Einstein disposed of the aether as well as of the Newtonian concept of an absolute reference frame.

New Ideas

Of even more importance were the new ideas which Einstein presented in this paper. The concept of simultaneous events was examined critically and was found to depend on the constancy of the speed of light. The deductions showed that "two events which, viewed from a system of coordinates, are simultaneous, can no longer be looked upon as simultaneous events when envisaged from a system which is in motion relatively to that system." He also showed the now famous transformation for moving bodies by which a measuring rod is shortened in the direction of motion, and time is slowed.

This latter result gave rise to the famous "twin paradox" by which one twin takes a relativistic voyage and returns to find himself much younger than his twin brother. Einstein wrote "If one of two synchronous clocks (i. e. twins) at A is moved in a closed curve with constant velocity until it returns to A, the journey lasting t_o seconds, then by the clock which has remained at rest, the traveled clock on its arrival at A will be $\frac{1}{2}t_o\ v^2/c^2$ second slow."

A furious debate about the validity of this idea occurred in NATURE MAGAZINE a few years ago. Much of the difficulty seems to stem from the concept of biological time and aging, rather than from the concept of physical time. An experimental refutation of the moving-clocks deduction would shake the foundations of relativity theory and much of modern science, while the resolution of the "twin paradox" in favor of no aging would merely raise questions about biological time.

$E = mc^2$

In a short companion paper, Einstein proved that a body giving off light energy, when seen from two systems in relative motion, loses mass; but since the two systems can be selected at will, any body emitting light energy loses mass. Thus he writes in a more general form, "The mass of a body is a measure of its energy content." From this, we now write $E = mc^2$. (E—energy, m—mass, and c—velocity.)

In 1916, Einstein extended the previous theory which was called "special" because it treated motion without acceleration. The new theory was called the "general" theory and was based on the idea that "The laws of physics must be of such a nature that they apply to systems of reference in any kind of motion." Much of this article is a mathematical description of tensors and how to use them. Einstein then used them to formalize a theory of the gravitational field. He predicted the curvature of light beams when passing through a gravitational field and a very slight change in the motion of the planet Mercury. These effects were later observed, although the checks on the general theory have not been as numerous or as satisfactory as those on the special theory. Einstein writes "Thus Euclidean geometry does not hold even to a first approximation in the gravitational field . . . although, to be sure, a glance at the equations shows that the deviations to be expected are much too slight to be noticeable in measurements of the earth's surface . . . Further, let us examine the rate of a unit clock, which is arranged to be at rest in a static gravitational field . . . (some calculations) . . . Thus the clock goes more slowly if set up on the neighborhood of ponderable masses. From this it follows that the spectral lines of light reaching us from the surface of large stars must appear displaced toward the red end of the spectrum."

Cosmology

The ideas and deductions of the general theory have given great impetus to the study of cosmology. In his 1917 paper on cosmology, Einstein writes: "From what has now been said, it will be seen that I have not succeeded in formulating boundary conditions for special infinity. Nonetheless, there is still a possible way out, without (giving up). For if it were possible to regard the universe as a continuum which is finite (closed) with respect to its spacial dimensions, we should have no need at all of such boundary conditions . . . . The theoretical view of the actual universe, if it is in correspondence with our reasoning, is the following. The curvature of space is variable in time and place, according to the distribution of matter, but we may roughly approximate to it by means of a spherical space." Thus was born the idea of the closed universe. Many other universes were invented, some that infinitely expanded with curvature and without, some that exploded in time, some that were continuous. It has not been possible to check the validity of any of these models.

The similarities and relationships between the gravitational and electromagnetic field equations led Einstein to spend the rest of his life looking for a unified theory, but this effort was not fruitful.

(Concluded next week)

SPECIAL bus driver R. E. Zupko won the City Transit System's June courtesy award after 47 Sandia employees signed a petition nominating him.

Riders of Special Bus #1 Have Their Driver Honored

Forty-seven Sandians who ride a special bus to work think their driver is great. To let him know how they felt, they signed a petition nominating him for the Albuquerque Transit System's monthly courtesy award.

That's how Richard E. Zupko came to be named the June driver-of-the-month and received a certificate of merit and gold tie clip from the system's director.

Mr. Zupko has been driving the Sandia Special Bus No. 1 for only four or five months but his passengers describe him as "an excellent driver," "safety conscious," and "a friend to many." Passengers further report, "He knows all his stops and waits for anyone hurrying to catch the bus."

Service Awards

15 Years


K. R. Baars
4151


C. H. Bidwell
1420


J. B. Boyd
9312


W. H. Chandler
3112


J. W. Garriott
9222


O. H. Heins
4542


F. G. Hohmann
8222

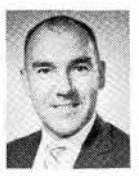

Edith Irwin
4213


R. P. Lambert
1544


Mae Lovelace
4234


M. R. Madsen
1512


W. L. Martin
3154


J. W. McKiernan
9331


G. R. Miller
3412


S. R. Pickens
8244


A. Y. Pope
9300


C. F. Selby, Jr.
2525

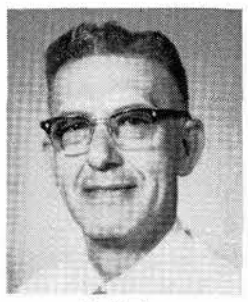

Mary Sumpter
4333


Betty Van Gundy
4131


Kathleen Wilson
4213


Eileen Zemka
2234

20 Years


F. H. Long
4252

10 Years

June 17-30

E. J. Graeber, Jr. 1122, R. D. Griffith 1332, R. W. Jorgensen 1513, J. T. Foley, Jr. 1541, Naomi Wynant 2234, J. S. Reese 2452, D. E. Alberts 3132, A. F. Huters, Jr. 7255.

J. V. Willems 7262, B. E. Ercole 9222, C. Q. Wilson 9232, E. L. Lane 1332, C. K. Hostetler 2413, J. G. Romero 3242, M. D. Hummer 4234, S. A. Ingham 7247, H. J. Blechinger 7324.

V. K. Smith 9226, E. H. Daugs 8168, R. F. Drury 1413, A. Darlene Kraft 9220, F. C. Sandoval 9411, K. E. Guerin 2555, J. A. Kersey 8127, L. D. Watkins 9212, C. R. Blaine 1425.

P. D. Landis 2213, Benito Padilla 4575, W. F. Gordon 8135, D. J. Burns 1334, D. W. Arquette 1422, H. A. Stuckert 1424, E. E. Ives 5621, J. R. Lenz 8252, and J. W. Long 9212.

Welcome Newcomers

May 31 - June 10

Albuquerque
Jimmie R. Chapman 1411
Tony Chavez 4574
Matilda Z. Christie 4381
Thomas R. Crites 3312
*William R. Entwisle 3463
Diana B. Freshman 3421
*Mary Ann Griego 3126
Vera Lee Kerr 3126
Charles R. Peeples 4574
Margery J. Poetzl 3126
Eleanor L. Poole 4312
*Margaret R. Romero 4333
*Josephine Sandoval 3126
Karen D. Shane 3126
Georgia M. Tate 4333
*Edwin C. Wittwer 9231

Missouri
Charles R. Borgman, Marshall 1000
Jerry A. Siemens, Rolla 7342

Nebraska
*James K. Linn, Lincoln 9233

New Mexico
Thomas A. Doom, Portales 2211
Robert M. Edgar, Las Cruces 2134
A. Ralph Kennedy, Portales 2211
Robert R. Kissam, Las Cruces 2422

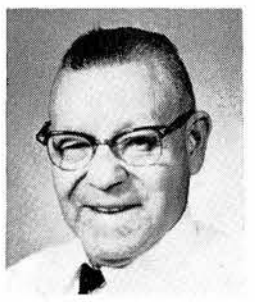
Ohio
Richard A. Newell, Fort Recovery 2126

Texas
Dorothy D. Mannahan, Alvin 9212

Utah
David W. Larson, Provo 9314

Temporary Summer Hires
(Albuquerque unless otherwise indicated)
Kent W. Andres, Ames, Iowa 1433
Carl M. Applewhite, Jr., Stillwater, Okla. 7211
*Sylvester A. Baca 2422
*Lee J. Bain, Rolla, Mo. 2113
*Herbert M. Barnard, Bryan, Texas 2421
*John H. Barthold 7224
Merle S. Benson, Portales 1121
Larry E. Bobisud 5261
Robert C. Bolton 3312
Ray M. Bowen, Baton Rouge, La. 1116
*Jack B. Brown, Austin, Texas 2153
*Aaron Cox, Jr. 5231
Gilbert B. Davis 7344
Henry M. Dodd, Jr., Lawrence, Kan. 7344
John R. Ellefson 9213
Richard A. Erth, West Lafayette, Ind. 1541
Archie V. Farnsworth, Jr., Mesa, Ariz. 9310
Henry C. Fleming III, Colorado Springs 5150
*Garland G. Gardenhire 9232
*Paul M. Geissler 1323
Leland Gion 2451
*William C. Hardy 5253
*Arthur V. Houghton 1541
*George W. Hudson 9212
*James D. Iversen, Ames, Iowa 9325
Cecil R. Lennox 2412
Rudolph B. Miller 7214
*Michael H. Pleck, Urbana, Ill. 1541
*Merle L. Quisenberry, Portales 2212
C. Annette Rappleyea, Boulder, Colo. 5232
Jon G. Rogers 9312
Ronald R. Rollins 1311
Thomas L. Ryan 2432
Stanley R. Sleeter 5155
Thomas N. Taylor, Ames, Iowa 5151
*Lewis Thigpen, Chicago 9321
David L. Wheeler, Provo, Utah 5242
Maurice W. Wildin 7323
Leon W. Zelby, Norristown, Pa. 5120
*Denotes rehire.

Retiring . . .



Octaviano Valdez, a Sandia employee for more than nine years, will retire the end of this month.

Octaviano has worked in the Janitor Service Division since he joined the Laboratory in Jan. 1957.

Mr. and Mrs. Valdez and their two youngest children live at 602 Broadway, SE. After retirement, they may move to Espanola to do some farming.

They also have six married children and 10 grandchildren living in Salt Lake City, Grants, Nevada, and here.

Trailer Travel Club Elects Sandians To Top Office

One look at the number of trailer hitches on automobiles and the pick-up truck campers in the Company parking lots leaves no doubt that camping is a popular leisure time activity.

There are four trailer clubs in Albuquerque, and about half of the members are Sandia employees. Einar Forsman (1323) was recently installed as governor of the New Mexico division of the Travel Trailer Clubs of America and Jack Benson (2562) is the new lieutenant governor.

In general, the local clubs are organized on a recreational basis. Members meet—with their trailers—one or two weekends each month at some interesting site, have a potluck dinner, and entertainment. There is also at least one national and one state division rally each year.

Travel Trailer Clubs of America is a national non-profit corporation which coordinates the interest and activities of the member clubs. It promotes and assists in creation and improvement of public and private parking facilities, encourages safe and courteous highway travel, and helps to solve problems faced by the trailer traveler.

SHOPPING CENTER • SHOPPING CENTER • SHOPPING CENTER • SHOPPING CENTER • SHOPPING CENTER •

CLASSIFIED ADVERTISING
Deadline: Friday noon prior to week of publication unless changed by holiday.

A maximum of 125 ads will be accepted for each issue.

RULES
1. **Limit: 20 words**
2. **One ad per issue per person**
3. **Must be submitted in writing**
4. **Use home telephone numbers**
5. **For Sandia Corporation and AEC employees only**
6. **No commercial ads, please**
7. **Include name and organization**
8. **Housing listed here for rent or sale is available for occupancy without regard to race, creed, color, or national origin.**

FOR SALE

'58 PONTIAC Starchief, 4-dr., PS, AC, new tires, Hill, 299-5785.

MINIATURE SCHNAUZER, registered AKC, 4-months old, male puppy. Shunny, 256-7391.

HEAVYWEIGHT swing set and slide. McBride, 299-2925.

MOUNTAIN STREAM frontage cabin site on Rio Blanco River in southwestern Colorado. Berry, 298-6996.

'48 HARLEY-DAVIDSON motorcycle. 74 FLH, street or dirt use, '66 plates, $250. Grace, 265-0594.

TIRES: 7:75x15, 2000 miles, $10; 6:70x15, 500 miles, $10; 8:15x15, 2000 miles, $12; 20" boy's bicycle, $10; *ranch oak dresser, twin/bunk* bed set. Luikens, 256-0437.

SAVE $45 over new price, Polaroid 100 Color Camera w/flash, $85; metal folding picnic table, 24 x 60", never used, $5. Machen, 298-1698.

OLD, ROUND oak pedestal table. Please, no calls until 8 a.m. Sat. Kampfe, 298-2295.

'56 FORD SW, V-8, PS, PB, AT, R&H, $125. Lambert, 344-9012.

5 ACRES in Bosque Village farm area, highway frontage, barn, 2 corrals, 50 ft. well w/pump house. Heath, 255-5418.

2 SOLID wagon wheels, $30; Appaloosas, 1 stallion, 3 mares, worth $1350, the package, $1125, terms available. Harker, 282-3435.

WOLLENSAK stereo tape recorder plus 8 tapes, hardly used, $140. Armstrong, 255-8862.

'60 FORD Fairlane 500, 2-dr. V-8, 292, Cruisamatic, wsw, seat belts, one owner. Cook, 268-6406 after 5.

'61 CHEVY wagon (Nomad), full power, factory air, R&H, rack, white exterior, red interior, seat belts, $1050. Ray, 299-5278 after noon.

HALLICRAFTERS: linear amplifier HT-41, transceiver SR-150, power supply PS-150-120. Heathkit 10 meter transceiver HW-19, antenna with rotor and 40' tower. Courtney, 255-0629.

'54 FORD 2-dr. hardtop, standard shift, overdrive, V-8, low mileage, R&H, $195 or less. Yuhas, 268-6269.

'61 OLDS Starfire convertible, new motor, trans., top, and tires, AC, complete power, must sell for amount owed. Heckman, 265-6348.

0.4 ACRE lot, Glenwood Hills, assessments fully paid. Randall, 256-1853.

'60 MERCURY Monterey 2-dr., Mercomatic, 66,000 miles, one owner. Butts, 268-7642.

LADY'S white shoe roller skates, size 9. Hagan, 296-2042.

WEBCOR 2-speed tape recorder $55 or trade for portable typewriter, or interested in buying typewriter. Houghton, 299-3386.

PIANO, mahogany spinet, Simpson & Son, w/bench, $250. O'Neill, 255-6355.

LEECE-NEVILLE alternator, solid state rectifiers and transistor voltage regulator, 6 volt 60A output, positive or negative polarity, $20. DeVore, 255-7211.

DRESSING TABLE w/padded bench, cost $80, sell for $27.50; two pair of table lamps. Nichols, 247-2564.

3-BDR. Mossman contemporary; carpeting, draperies, AC, dishwasher, refrigerator, double oven range, two patios, near bus, $18,500. Gardner, 268-3630.

SCOTT 72 watt dual channel stereo amplifier, new, $100 or best offer; a pair of 4-strand clothesline poles, best offer. Jones, 268-5236.

ELECTRIC GUITAR and amplifier, both for $75 *or trade for portable dishwasher or* patio table. Young, 255-9022.

KODAK 35 Retina reflex 5, 50mm f/2.8 lens, lens interchangeable, auto. exposure control, range finder, case, flash, $60. Bressan, 268-5367 after 5.

FREE to good homes: female collie, 6 months old, and male puppy, 2 months old. Cox, 299-2393.

ONE-WHEEL trailer w/two boxes, $40; automatic washer, it works, $35. Breitenbach, 268-7900.

JUST FINISHED, 2-bdr. house, underpriced at $8500, North Valley. Chavez, 298-5091.

REDECORATED 3-bdr. home, w/w carpet, AC, large walled yard, patio, NE heights, small down to existing loan. Nevin, 298-0383.

FIVE-YEAR-OLD mare, gentle with children, $200; two-year-old mare, untrained, $200; 250cc Jawa, new, $400. Shock, 877-3728.

GERMAN shorthaired pointer, excellent hunting companion, both pointer and retriever champion pedigree, pick of litter, female puppy. Tessler, 296-1025.

TINY TOY poodle, male, cream color, excellent lines, apricot colored sister, available now. Souther, 282-3841.

LARGE 3-bdr., den home, fireplace, dishwasher, 2½ baths, large patio. Young, 255-4523.

GERMAN SHEPHERD puppy, registered, top quality, special price if interested in showing. Villella, 298-7955 or 268-1363.

MIN. SPEED GRAPHIC, light meter, tripod, dev. tanks, enlarger, trays; AF 67 xmitter, 3-band vertical antenna, instructograph tape machine w/tapes. Scussel, 644 San Pablo SE, Apt. B.

STEEL SASH window, 36 x 48" w/glass and screen. weather stripped, framed, $10. Howe, 344-4798.

AKC REGISTERED, champion background, silver poodle puppies. Schafer, 299-4634 after 4:30.

'58 CHEV. 4-dr., automatic, R&H, 8-cyl., new paint, $375; 1.6 hp Briggs & Stratton gas motor, $10. Sweatman, 2017 Cagua NE, 256-0300.

CAMERA, 2½ years old, Argus C-3, case, flash, sensitive meter, $35 — ½ cost. Colquitt, 298-2113.

15' FIBERGLASS boat, 1961, 75 hp Evinrude motor, electric start and shift, best offer over $1000. Rathbun, 298-4745 after 5:30.

GIRL'S 26" Schwinn bicycle, carrying basket, thornproof tubes in both tires, $25. Ryan, 299-3318.

'59 OPEL station wagon, $325. Graham, 268-0789.

MOSSMAN 3-bdr., family room, 1¾ baths, carpeting, drapes, completely landscaped, walk to schools, $18,900, 3609 Dakota NE. Bader, 299-9459.

3-BDR., AC, carport, large enclosed yard, 5 min. to base, quick sale, $9500. O'Boyle, 268-1436.

ELECTRIC SEWING machine, cabinet model, $40; three fine turquoise necklaces at wholesale price. Carroll, 299-5358.

'62 CHEV. ½-ton pickup, best offer. Nelson, 298-4233.

STEREO AMPLIFIER, 50 watt Sherwood S-5500, two 25 watt channels, $54.50. Henry, 1828 *Florida NE, 256-2467.*

DROP-LEAF TABLE, daybed sofa, cherrywood cabinet, end table, two chests of drawers. Strasburg, 299-4214.

3-BDR., den, dining room, on one acre Los Lunas area, 8 additional acres available. George, 865-7969.

120 ACRES *mountain land, stream running* length of property, never goes dry, good fishing. Huston, 243-2589 after 9 p.m.

'62 RAMBLER convertible, automatic, R&H, reclining bucket seats, low mileage, below book. Lenz, 265-0915.

HAM EQUIPMENT, AF-67 transmitter, NC-98 RCVR, power supplies, mikes, misc., trade for stereo tape recorder or cash. Johnson, 298-7356.

'63 OLDSMOBILE 98 sports coupe, R&H, AC, AT, power seats, windows, mileage 26,143, no trade, $2250. White, 299-3095.

'64 CORVAIR Monza coupe, 110 hp, 4-speed, R&H, one owner, 14,000 miles, like new inside and out. Gregory, 268-2022.

CAMPING TRAILER, canvas type, gas bottle with three burner stove and butane lamp, sleeps four. McElroy, 8907 Los Arboles NE, 299-4977.

PLAYPEN and pad; 24" TV with wooden cabinet, not working. Bowen, 255-8195.

'60 FALCON, 2-dr., standard, R&H, dependable. Gay, 299-5625.

'55 PONTIAC, automatic, 4-dr., two-tone, low mileage, dependable. Blakey, 298-0511.

'55 CHRYSLER Windsor, hardtop, 73,000 miles, $195. Reinman, 256-9737.

'56 BUICK 4-dr. station wagon, AC, $250; Sears sewing machine, $25; steel trunk, $5; round top trunk, $3.50; doghouse, $3; misc. Thornton, 299-5747.

'57 TRIUMPH TR-3, many extras, sell or trade for VW, maybe? Taylor, 256-3774.

'55 FORD Fairlane, 2-dr., V-8, stick, R&H, tu-tone green. Love, 299-0956.

'57 FORD country sedan station wagon, $225. White, 9713 McKnight NE, 299-6411.

3-PC. Drum plastic settee, $25; poodle puppies, silver miniature, females, 9 weeks old. Workhoven, 282-3246.

'61 FORD pickup, 4-speed, Positraction, heavy duty shocks, springs, tires, new tinted windshield, $795 ($115 below book). Floyd, 299-2419.

ROBERSON 3-bdr., family room; ½ acre mountain lot. Elson, 298-4216.

HOMES FOR grey and white kittens, Tatum, 877-0997.

MUZZLE LOADING percussion cap shotgun; spoon-foot harvest table, 60" long. Wilson, 282-3225.

AIR COOLER, 2-speed w/built-in circulating pump and roll-easy stand, 110 volt. Coffey, 255-1062.

'54 TRIUMPH TR-2, recent overhaul, new clutch, wire wheels, disc brakes, $750 or best offer. Dowd, 299-8473.

3-BDR. MOSSMAN, below FHA, fireplace, AC, DR, hw/floors, walls, patio, landscaping, NE, $12,000. Freeman, 299-1481.

WATCH REPAIRING equipment; small refrigerator; 10 gal. aquarium and accessories. Iverson, 298-1936.

AMC 2-speed room fan; electric baby bottle sterilizer; two pair 10N women's shoes, worn once. Eberhart, 268-6943.

'57 BUICK Super, hardtop, one owner, power steering, new power brakes, extras. Durrie, 298-0209 after 5.

'51 OLDS 2-dr., AT, reliable transportation, $150. Hole, 255-1444.

'62 M.D.S. Super Dart motorcycle, 75cc's, under 4500 miles, 150 mpn, 4 cycle, no gas-oil mixture, $450 new, $195 or offer. Williams, 299-8744.

6:70x15 tires and tubes, Sears 27 mo. guarantee, one month's use. $10 per tire and tube. Keith, 2812 San Pedro NE, 268-8805.

'62 BUICK station wagon, R&H, auto. trans., factory air, V-8, $850. Stronach, 5500 Arvilla NE.

STOVE, electric, white, double oven, rotisserie, completely automatic. Armijo, *256-1629 after 5* or weekends.

55 x 10 AMERICAN mobile home w/expando room, front kitchen, two bedroom, awnings. Morton, 9000 Zuni SE, space F-17.

3-BDR. MOSSMAN, 1¾ baths, fireplace, AC, builtins, landscaped, near schools, Coronado, *assume 4½% loan or refinance.* Keith, 2812 San Pedro NE, 268-8805.

S&W 44 Magnum revolver, Herrett's grips, $100; Marlin .22 cal. model 39 rifle, $45. Parks, 296-2261.

'55 PONTIAC convertible, auto. trans., R&H, power top, power brakes. Mitcham, 299-8425.

$800 DOWN, Roberson, 3-bdr., 1¾ baths, den w/fp, dbl. garage, hw/floors, corner lot, near Eastdale, $18,400. Duvall, 10100 Toltec NE, 299-8744.

THREE SQUARE dance dresses. Johnson, 298-0296.

KELVINATOR refrigerator, 15 years old, 50 lb. freezer on top, $35. Cates, 299-4740.

HOMES FOR free kittens, black, grey, tabby, 8 weeks old. Jones, 298-9949.

'52 DE SOTO, $100; wooden doors, mahogany and beech, new, some slightly damaged, $1-4; new screen doors, $2.50. Hyde, 268-2885.

'58 RAMBLER Classic., 6-cyl., R&H, OD, $225. Huddle, 265-6248.

VERY OLD chest of drawers, trade for equivalent lumber. Wentz, 298-2630.

RECORDS, collector's items, classical and popular. Sturges, 256-9425.

BILNOR swimming pool, 18 ft. diameter, 3½ ft. high filter, ladder, cover, vacuum cleaner, net *cleaner, $125. Fine, 298-2484.*

3-BDR., pitched roof, near Manzano high, $400 down, $100 per month, make offer on purchase price. Berger, 296-4587.

VACANT LOT, close to Sandia Base, Espanola SE. $2500. Perea, 268-2287.

3-BDR., ROBERSON near Collet Park elementary school, drapes, AC, fallout shelter, sprinklers front and back. Losinski, 298-4597.

GIRL'S 26" bike. Gonzales, 256-6728 after 5.

USED, random drilled, acoustical tile, 12" x 12", take the lot, 100-200 for $10. Joseph, 268-5414.

ANTIQUE dining table, 4 chairs, mahogany, $30; stereo tape recorder V/M, $90; galv. twin tubs, $9. Baca, 255-8452.

'55 MERCURY station wagon, $75. Foster, 265-0065.

MAN'S 3-speed English bicycle with lights, generator, baskets, and new thornproof tubes, $20. Burd, 296-4124.

WANTED

SWING SET in good condition: two swings, glider, facing swing seats, and slide. Asselin, 299-9270.

APARTMENT or house, 2-bdr., furnished, University walking distance, approx. July 1 thru Aug. 14. Write George Dalphin, 500 Princeton SE, No. 1.

SUMMER HOME at reasonable rate for graduate woman in physics with cat. Rappleyea, c/o Bruce, 299-2542.

BESSELER Topcon Super-D and accessories. Ray, 299-6345.

USED fiberglass drapes, size and color not important. Longfellow, 299-7062.

CHILDREN'S outdoor climbing tower and tetherball outfit. Erickson, 298-4416.

PLAYER piano music rolls. Sander, 299-5761.

WINCHESTER rifle, .22 Hornet or 218 Bee, any condition. Svensson, 344-7700.

FIVE SANDIANS interested in a seminar in State Variable Approach to Systems Analysis, Prof. Karni will teach the seminar. Steelman, 255-5763.

OLD KNIVES of any kind or condition, will pay cash. Smitha, 8607 Menaul NE, 299-1096.

TO BE A RIDER in carpool, vicinity Indian School and Morris to Bldg. 840. Fisher, 298-7858

CANOE, 14 to 16 ft., fiberglass preferred. *Gladow, 299-5602.*

FOR RENT

FURNISHED and unfurnished 2-bdr. apartments, AC, auto. washer, water paid, no pets, $87.50 and/or $65 monthly. Villella, 268-7591, 268-1363.

3-BDR., 1¾ *baths, AC, unfurn., built-in* stove, water paid, walled yard, patio, sprinklers, no pets, 8811 Claremont, July 1, $145/mo. Finley, 299-0739.

LARGE HOUSE, country living. Placitas area, available July, all utilities available, garage, corral, room to roam, modern conveniences. Illing, 299-7378.

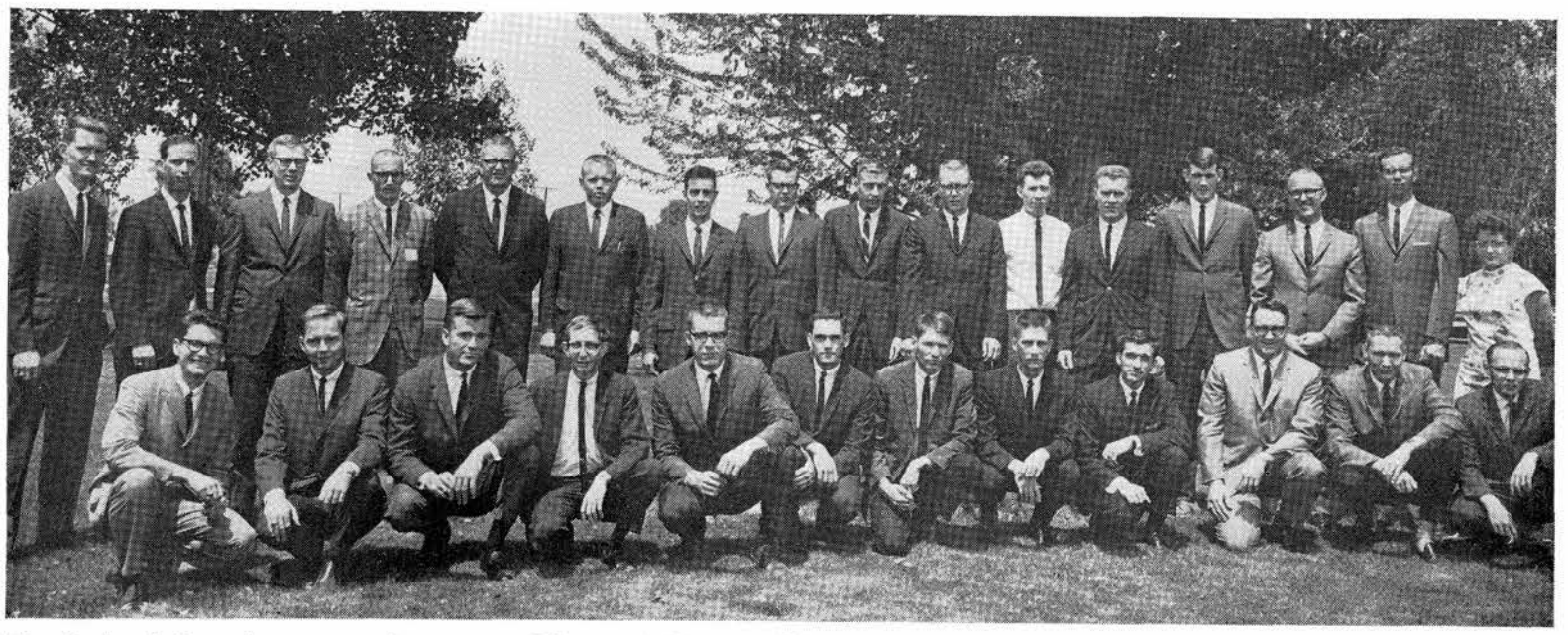
HOUSE, unfurnished, 3-bdr., 1¾ baths, family room, two-car garage, corner Eubank and Shoshone. Wentz, 298-2630.

LOST AND FOUND

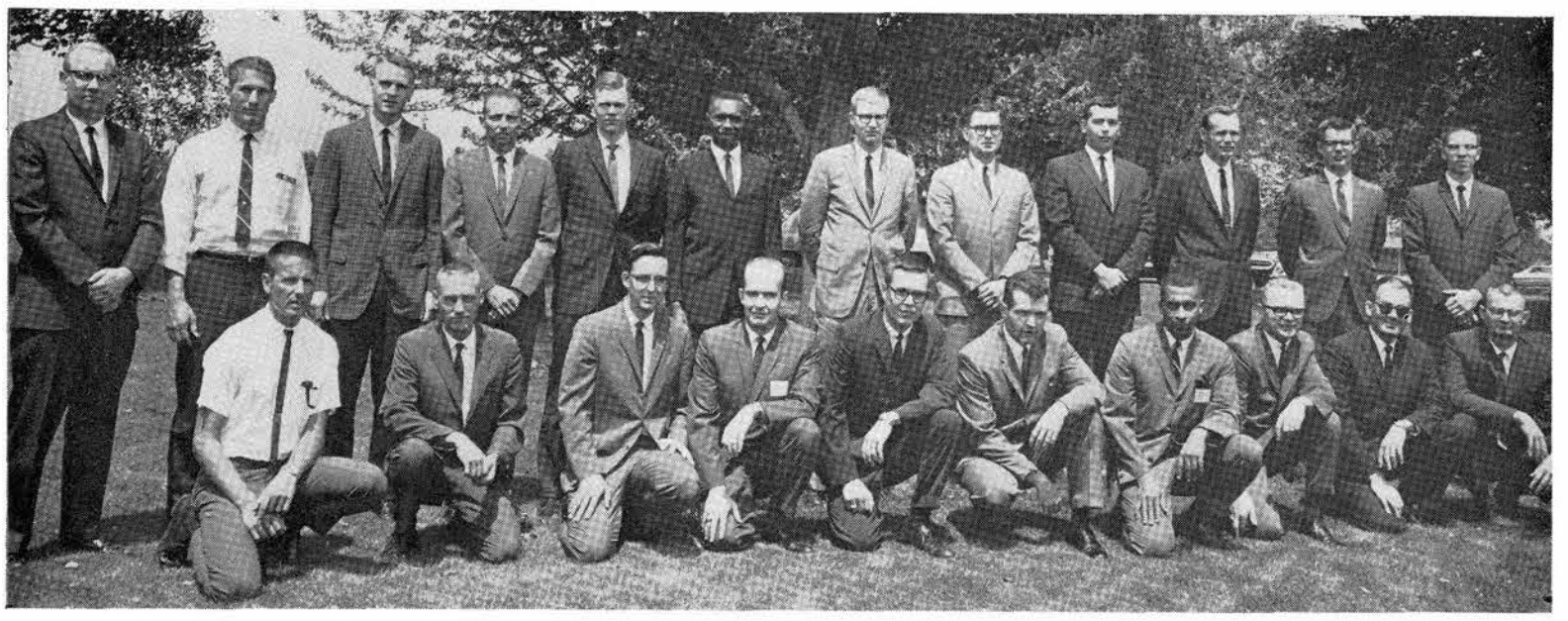
LOST—wallet in *men's locker room, Coronado Club, Sunday, June 5.* Reward. Elrick, 298-7613 after 6.

LOST: sunglasses, lady's curved black frames; white cardigan sweater *w/long sleeves;* dark brown wallet; 15 yr. SC emblem tie tack; man's Timex watch, gold w/expansion band *(reward).* LOST AND FOUND, Bldg. 610, tel. 264-2757.

FOUND—7 keys *on ring w/tab U.S. Govt.;* 6 keys on ring w/disc motto "God Grant Me the Serenity, etc." LOST AND FOUND, Bldg. 610, tel. 264-2757.



Technical Development Program Class of '66 — "Looking forward to your contributions. . ."



(Continued from Page One)

53 Complete TDP

only the advanced "core" courses of the TDP program developed specifically for Sandia Corporation areas of interest. Members of this group were Robert A. Benham (7325), Donald R. Bjork (2421), Jerry M. Freedman (1541), Thomas B. Linnerooth (1432), Gerald M. Ozanne (9325), James E. Steelman (5621), Marlyn W. Sterk (7324), and Richard M. White (7511).

Completing the two-year TDP program of advanced study were Joseph P. Abbin, Jr. (1331), Winser E. Alexander (2344), Hans M. Aus (2344), Gail Barton (1533), Richard W. Beegle (7332), James W. Campbell (1531), Olin K. Conley (1431), Thomas L. Cordell (2543), Robert K. Cover (2564), Robert H. Croll (7422), James F. Desler (2422), Gordon J. Dodrill (7245).

Virgil L. Dugan (2423), Michael J. Eaton (1313), Donald G. Eitsen (7325), T. Franklin Ezell (5133), Ronald L. Flury (1542), Orvel D. Fogg (1425), John R. Freeman (2421), Oscar L. George (7422), Edward D. Graham, Jr. (7331), Tommy R. Guess (7324), Richard S. Hagins (7224), Preston B. Herrington (7431).

James W. Hole (2423), Robert N. Horton (7411), Norman F. Hunter (7324), James E. Hyland (7334), Donald A. Jelinek (1442), Larry K. Johnson (1533), Stephen C. Johnson (9234), Ned R. Keltner (7325), Edward D. Kist (7253), Roger J. Mattson (5332), David L. Preston (7323), Eric W. Reece (7422), Gary J. Scrivner (1541), Paul S. Skabo (2543), Robert D. Solberg (2544).

Robert M. Stearley (1522), Daniel D. Syroid (7245), Leroy E. Torkelson (7323), Anthony F. Veneruso (7253), and Charles B. Watkins, Jr. (7253).

Sympathy

To Don S. Lovato (4574-2) for the death of his father, May 26.

To Maxine Gatlin (3154) for the death of her mother, May 28, in Amarillo.

To T. B. Sherwin (3431) for the death of his father-in-law, June 1, in Cody, Wyo.

Newsom Wins Again

Max M. Newsom (5611) was the grand sweepstakes winner of the Albuquerque Rose Society's 17th annual rose show recently. Max won the most blue ribbons in the horticulture division and was presented a silver trophy and a silver coffee and tea service. More than 1000 entries were exhibited at the show.

Congratulations

Mr. and Mrs. James Warmkessel (4254-2), a son, Todd, on May 23.

Mr. and Mrs. Robert A. Trudo (5151), a daughter, Donna Marie, on May 4.

Summer Season Swings

Oil the Hip Joints for Adult Go-Go, Hula Time at Club's Hawaiian Luau

Summer social season is in full swing at the Coronado Club.

An adult go-go will vibrate the place tonight following social hour, a Hawaiian luau will bring exotic food and drink next weekend, and an old-fashioned Fourth of July picnic will appeal to the family on Independence Day.

C'mon out to the adult go-go tonight and regress a little. Teen-agers have nothing on the regulars who attend this event. You'll see an enthusiastic monkey, frug, etc., somewhat tempered by maturity. The mayhem starts at 8:30 p.m. tonight. Admission is free.

On Saturday, the twin pools will be closed to recreational swimming while the Tenth Annual Coronado Club Swim Meet runs competitions for youngsters of all age groups. Spectators are welcome. Nine teams and some 485 swimmers will be competing.

On Saturday, June 25, the annual Coronado Club Hawaiian Luau will issue its call to the Islands. The menu will feature roast leg of pork, crackling young pig, sweet and sour pork, lomi lomi salmon, and the regular chuckwagon roast beef.

Providing a special hour of entertainment will be the Navy Steel Drum band. Calypso, island melodies, and tropical rhythms will be aired from 7:15 to 8:15.

Sol Kanaka Chavez will play for dancing from 9 to 1 a.m. Grass skirts, sarongs, and wild sport shirts are appropriate as is a lively hula. Admission is $3 for members, $3.50 for guests. Aloha!

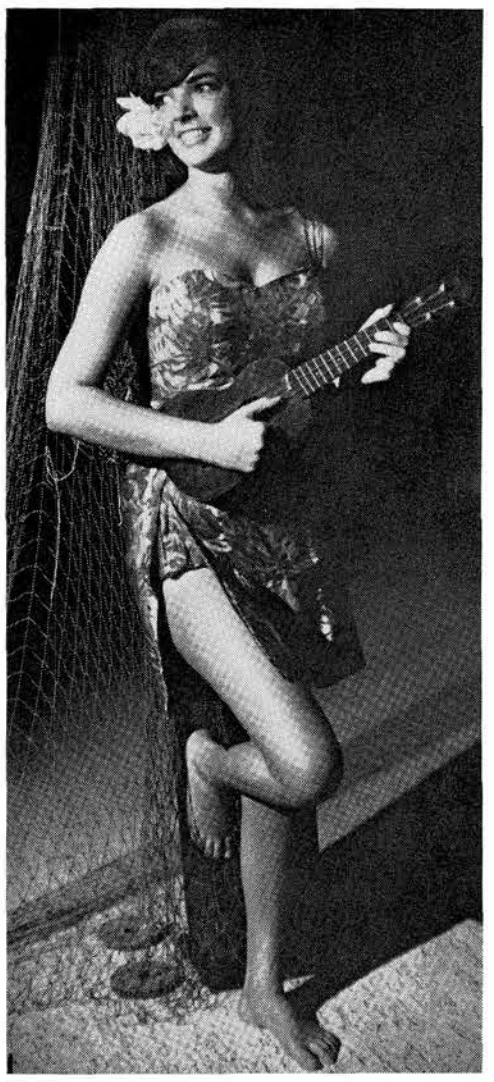
For the Fourth of July, a special family picnic with games for the kids, free hot dogs, baked beans, chocolate cake, and fun for all is planned. The event starts at 1:30 p.m. and will run until exhaustion or 7 p.m., whichever comes first. Club members only, please. The fun is planned for the patio area adjacent to the twin pools. The weatherman is predicting a fine day.

Social Hour

The happy music will be by Tommy Kelly and the group at tonight's social hour. You can't beat the chuckwagon roast beef and shrimp buffet for popularity. Buffet costs $1.75 for adults, $1.50 for children. Afterwards, stay for the adult go-go party.

Next Friday, Sol Chavez will provide the music for social hour. The seafood buffet will be served—$1.25 for adults, $1 for kids.

On July 1, social hour will feature Max Madrid with mood music for the Mexican buffet.



GOING NATIVE, Jane Champagne (2552) anticipates the Coronado Club's annual Hawaiian Luau scheduled June 25. An exotic Island menu is planned with special entertainment by the Navy Steel Drum Band. Sol Kanaka Chavez will play from 9 to 1.

Safety Record Falls As Employee Slips Off Chair

An employee was injured June 1 when she missed the chair she was attempting to sit down on. The employee was standing by a TWX machine and apparently struck the chair with her heel and pushed it backward a few inches on its casters. Then, when she attempted to seat herself, she sat down on its front edge and slid off the seat onto the horizontal pedestal leg of the chair. She suffered severe contusions to her lower back.

She was taken directly to a local hospital by a Sandia ambulance. X-rays were taken and she was treated by a specialist. She is now back at work.

At the time of the accident, Sandia Laboratory employees had worked 21 days or 735,000 hours without a disabling injury.

Photo Lab Injury Topples SCLL Record

An accident, which occurred June 10 in a photography dark room at Livermore Laboratory, resulted in an apparently serious injury to an employee.

The employee was developing film in total darkness. He bent down to pick up a dropped roll of film and struck his eye against a can opener mounted on the side of a work bench. He was given immediate treatment at the SCLL first aid station and taken to an eye surgeon in Hayward where cuts on his eyeball were sutured.

The employee is still under medical care, but loss of sight is not expected.

At the time of the accident, Livermore Laboratory employees had worked 163 days or 846,700 man hours without a disabling injury. The employee's department (8230) had a record of 1,226,500 injury-free man hours.

Sandia's Safety Scoreboard

Sandia Laboratory:

13 DAYS

455,000 MAN HOURS

WITHOUT A

DISABLING INJURY

Livermore Laboratory:

1 DAY

7500 MAN HOURS

WITHOUT A

DISABLING INJURY